

Psychological Review

EDITED BY

HERBERT S. LANGFELD
PRINCETON UNIVERSITY

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THE PSYCHOLOGICAL REVIEW

THE THREE CONTEXTS OF HUMAN BEHAVIOR

BY H. W. WRIGHT

University of Manitoba

There are two outstanding facts about the meaning that attaches to human activities and to the variety of objects and situations with which such activities are connected. One is that meaning along with the relationships it involves, depending as it does upon the past experience, present interests and prospective goals of the individual human being, varies indefinitely from one individual to another. The other is that meaning is actually operative in determining the behavior of the human organism. These two facts, taken together, set a problem for the psychologist. In all behavior that has the marks of intelligence it is the meaning of the stimulus-situation which determines the character of the response. But since such meaning always reflects the personal experience and point of view peculiar to the individual responding, it becomes a difficult if not impossible undertaking to discover and formulate general laws which will predict how all individuals will behave in a specific type of situation. The two facts mentioned severally suggested two historic and opposing lines of attack upon the problem of meaning. One, starting from the premise that meaning is a property of conscious experience, of the mental states of individuals admittedly open only to introspection, attempted to discover, first, the elementary components of all mental processes in all individuals, and, secondly, the universal laws which govern the combination of these mental elements into the variety of meaningful complexes found in individual experience. Even

as an explanation of the subjective experience of meaning, this procedure is now seen to have been unfruitful; Titchener himself was forced to acknowledge the impossibility of reducing meaningful phenomena to meaningless sensations and affections (5, p. 495). The other and opposite line of attack was based itself on the second-named fact that meaning is actually operative in determining behavior. Accepting the stimulus-response principle as scientifically axiomatic, behaviorism identified meaning with 'implicit' anticipatory response, principally the 'symbolic' responses of inner speech, which by proprioceptive stimulation evoke forms of overt, adaptive behavior. As for individual variability in the linking and combining of such implicit responses, this was held by behaviorists to be explainable by the objective laws of learning, such as conditioning, habituation, canalization, etc., whose total, long-run effect is bound to vary greatly with the particular hereditary and environmental factors operative in an individual's life-history.

More recent Gestalt theory has the merit of attempting to do justice to these two aspects of meaning which appear to point in opposite directions. The relations which constitute the meaning of an object are understood as relations between it and other objects in a field spatially and dynamically configured, relations which pertain to and guide the goal-seeking activities of the organism. This environmental field is of course objective and in large measure identical with the world of common perception and adaptive behavior; it is the life-space of the organism in which it exercises its powers of self-conserving adjustment. But it is at the same time a field organized by the controlling interests of the individual, a field whose component objects are related by the part they play in the pursuit and fulfilment of these interests. These environmental objects are not conceived as forms of physical energy which act as causes of sensory stimulation. They are rather those things and matters and activities of vital importance and social concern with which the human individual has to deal in his everyday behavior. They are, nevertheless,

susceptible of experimental control and their influence on individual behavior can be investigated by laboratory methods.

Adoption of the configurational approach to the problem of meaning does not, however, preclude a difference of emphasis on one or the other of the two aspects, of phenomenal content or of operative function. One emphasis is well illustrated by the views of Snygg, as stated in a recent article (13). He maintains that solution can be found for the problem of meaning (and of learning) only through developing configurational principles along purely phenomenological lines (13, p. 423). He holds that the process of learning can be understood, and individual behavior predicted by the observer (or the psychologist in the role of observer) only if he is able (1) by inference or reconstruction to secure an understanding of the subject's phenomenological field and (2) to project the future field (13, p. 413). By the phenomenological field of any individual is meant the universe including himself, as immediately experienced by the subject at any moment. The phenomenological fields of individuals are fluid and shifting; their contents, including memories, are continually reshaped and given meaning by the character of the total configuration (13, p. 411). In answer to the question whether there is any law governing changes in all such fields that gives us a clue to the alterations of meaning which issue in greater precision of behavior and hence may be regarded as genuine learning, Snygg finds such a law in *differentiation*, the basic act of knowledge, which is a manifestation of the continuous process whereby the integrity and organization of the individual field, of rat or human, are maintained (13, p. 414).

Within the limits of a broadly configurational approach, we find the opposite emphasis illustrated in an argument by Griffith in support of a dynamically and configurationally grounded functionalism in psychology (4). Such functionalism, as he describes it, would take account of the contents of mind, the 'whats' employed in the course of adjustment. But it would concern itself also, and primarily, with the 'how,' i.e., the adaptive responses and the acts, faculties, vectors, or functions, in terms of which such adjustments are

mediated. By any ordinary interpretation of operational techniques, he asserts, the natural data of psychology are performances in contexts (4, p. 207). And 'context' in such cases is identical with meaningful environment. "Among the *whats* long called mental are the 'things' perceived in the so-called 'external' world, and all the memories, ideas, concepts, judgments, beliefs, sentiments and other members of the so-called 'thought-about' world." "They should be numbered among the objects which serve as the instigators to, the means for, and the goals of, the adaptive performances of living creatures" (4, p. 208). The defining features of behavior, *qua* behavior in its context, can be established by an experimental procedure which brings to light its operating nature as determined by the relations "which obtain between it and the probe bodies that are used as the relevant features of an instigating, directing and sustaining context" (4, p. 217). Thus it appears that 'relevant context,' while subordinated to adaptive performance and defined operationally, does nevertheless in Griffith's view supply an objective field, order, or system, whose dynamic organization gives meaning to the activities of human individuals and enables the psychologist to describe them concretely and genetically as ways of getting mental work done—abilities, faculties, vectors, such as perceiving, attending, emoting, conceiving, purposing, thinking, selfizing, etc. (4, p. 216).

Adopting a conception of the field and method of psychology in general agreement with the type of functionalism represented by the views of Griffith, and of Bentley (2, pp. 15-31), which treats experienced and meaningful objects as the relevant context with reference to which all human activities have to be described and explained, my wish here is to consider more fully the make-up and organization of such contexts. The objects which compose them—whether of perception, memory, purpose, emotion or cognition—are not to be understood as mental in the dualistic sense (15). In their orderly systems, they constitute the objective environment, the 'external' world, to which the human individual responds. There are, I believe, no less than three such dis-

tinguishable contexts which define the goals of human action and determine the meaning of the facts and forces with which human organisms have to deal in their daily behavior. They are not separate, to be sure, in the sense of being independent in character and function. They are certainly overlapping and interpenetrating. They may, indeed, be looked upon as different, partial disclosures of the one objective environment which conditions all human action. But they are nevertheless distinct in the sense of being distinguishable with respect to (1) the character and relations of the member-items which engage in their dynamic configurations, and (2) the human activities, capacities or abilities, to which these objects are related and relevant.

The first context is familiar to us as Koffka's 'behavioral world' (7, Chap. II), Lewin's 'psychological life-space' (8, p. 74), and Brown's world of 'perception and work' (3, p. 285); hence it needs only to be briefly described for purposes of comparison. It is the world of immediate experience, whose objects are perceived as externally existent. These objects are constellations of qualities and relations, qualities which are transposable marks of identification, and relations which impart meaning. But these features do not make the world of naive perception a subjective or purely mental realm, or afford any justification for reducing the significant properties of its objects to terms of mental content. For the world of perception is at the same time the field of action. It presents the concrete stimulus situations which evoke adaptive responses from living individuals. The organizing relations which give meaning to its objects are consequently dynamic, *i.e.*, they operate as forces which control the behavior of the percipient organism. The objects or items which comprise the behavioral world include, of course, both inanimate things and processes, and other individuals with their differentiating characteristics and modes of action. "All these things and events," as Lewin says, "are defined for the child partly by their appearance, but above all by their *functional possibilities*. . . . The stairs are something that one can (or cannot yet) go up or down, or something that one climbed yesterday

for the first time" (8, p. 77). In addition to this, some objects exercise a more pronounced influence on behavior and upon the organization of the behavioral field. These are objects which by their distinctive appearance make connection with the momentary need of the percipient organism. Such objects, perceived as means to the satisfaction of a need, or as having indirectly something to do with the satisfaction of a need, determine the direction of behavior (8, p. 78). This kind of force or 'valence' exerted by some perceived objects on behavior may be positive or negative according as it operates to produce responses of approach and appropriation, or of withdrawal and escape. The advent of a valence brings about a dynamic re-organization of the field of perception and action. Other objects are perceived in accordance with the parts they play, with their 'steering function' in valence-controlled action—some as pathways toward, or instruments for, and some as barriers to, or detours to be taken in, goal-directed locomotion. The organic activities upon which the behavioral world depends for the structure and organization that differentiate it from other contexts are mainly those motor habit-patterns acquired by conditioning and by insight in the course of focalized effort to satisfy fundamental physiological needs for food, drink, warmth, human contact, rest, activity, etc. The energy expended in such activity is aroused by autonomic tensions which may or may not receive emotional reinforcement from intra-organic sources.

The existence of a second context with its distinctive dynamic organization is plainly indicated by the operation of a group of motives in human behavior which differ unmistakably from the physiological drives aroused and directed by the objects of the behavioral world. The reason for this difference is that the second group of motives is directed upon goal objects which derive meaning from an environmental system of objects and relationships that differ markedly from those which determine the direction of organic strivings to fulfil vital need. These motives are sometimes called 'ego,' in distinction from 'id,' motives or, with regard for the context in which they operate, 'social' motives. Such a motive,

for example, is the wish for achievement and recognition, variously called the ascendance, prestige and dominance motive; to the same class belong the desires for sexual response (at any rate, when this involves some degree of personal recognition), for companionship, and for friendly love. Whether an object will arouse need-fulfilling, or ego-assertive and ego-defensive reactions, depends entirely upon its meaning in the particular instance, that is to say, upon the context to which it is, or is taken to be, relevant. Whether the refusal by the mother of a child's request for an ice-cream cone gives rise to effects of frustration such as aggressive reactions, will be determined, as Maslow has pointed out (9, p. 364), by the meaning which the mother's refusal has for the child, whether it signifies, on the one hand, simply being deprived of a momentary sensory gratification, or, on the other, being deprived of the mother's love, which is a direct threat to his ego-security and self-esteem.

It would be wrong, however, to suppose that the so-called ego or social motives, and the further interests which they engender, create man's social environment or are basically responsible for its dynamic structure. These action-tendencies are socially directed, to be sure; but, at the most, they are complementary in their advent and development to the rise and organization of the world of social life and culture. If any organic capacity is to be singled out as basic to the social context of human behavior and as the source of its distinctive make-up and organization, surely it is the capacity which human beings possess of *inter-communication*. It is this activity, the exchange of meaningful and mutually intelligible experiences, which enables human beings to compare their respective opinions, abilities and worth, to participate in joint interests, purposes and enterprises, and to be governed in their everyday interaction by common cultural norms, products and expectations. Intercommunication between individuals in human social life is effected by three response-agencies (16, Chap. IV). The most obvious and familiar is that of articulate speech. But communication is not limited to this organic instrumentality. Goal-directed action is also

a mode of communication between person and person. As F. H. Allport has shown (1, p. 172), we ordinarily apprehend what another is 'trying to do' not indirectly by any process of inference by analogy, but directly, by observation. We perceive others' actions in terms of the further acts required functionally to round them out and give them dynamic closure. A third agency of communication is to be found in the muscles governing facial expression, also gesticulation and posture, as employed in emotional expression. It is now generally understood that patterns of emotional expression, modified and standardized by social example and training, constitute a veritable language of the emotions, an organic agency for the communication of feeling, not in the abstract of course, but in the objective, situational contexts which give them meaning. Communication through emotional expression is elaborated, refined and standardized in, and by means of, the various art-forms like music, dancing, dramatic and pictorial representation, etc., which develop from it through cultural incentive and effort.

Activities of inter-communication are fundamental to the structure of the social world because they make possible the emergence of the characteristic member-items of this context. Through the kind of association they bring about, the individual gains an idea of himself in relation to, and in comparison with, other selves. These social objects are dynamic in the fullest sense; they furnish new fixation-points for the impulses, desires and aspirations of the human organism; they possess in themselves, and on their own account, interest and value. For the individual, the growing idea-system which stands for himself, his abilities and status, is the subject of lively, pressing, continuous concern. In comparison with others, and in the light of their reactions, the worth of the self is estimated and re-estimated: sometimes it is viewed with complacency or admiration, sometimes with dissatisfaction and disapproval, even shame and bitter condemnation. The self is not only a value; it is at one and the same time the means to all other values and the end to which all other values are instrumental (10, pp. 207-216). Also the other selves

with whom the individual is associated possess valence, positive and negative, they may be liked or disliked, loved or hated, trusted or distrusted, may be admired, envied, feared, suspected. As the several dynamic idea-systems signifying the self and other persons develop and mature in the course of personal association, they give new meaning to the contacts and interactions of individuals in the family, neighborhood and local community. Participation in the experiences of others consequent upon intercommunication makes it possible and natural for the individual to identify himself with them in beliefs, feelings, and aims. Such identification may be with individuals or with groups. It appears in anticipatory form, even antedating the clear differentiation between self and others, in the identification of the infant with the mother, presumably from primitive sympathy and conditioned imitation. Self-conscious identification at a later period may be with admired and loved individuals, with other face-to-face groups, or with extensive political, industrial or religious organizations. The important point is that the social object with which identification is made becomes for the individual the dynamic equivalent of himself.

Interaction between selves as members of a continuing group is responsible for a third distinctive feature of the social context, viz. social culture, including approved and enforced modes of social behavior and relationship, and 'social culture products' such as industrial tools and methods, art, religion, science. Social culture is a co-operative achievement of many individuals associated in the life of a continuing group, the cumulative results of which are perpetuated or reproduced through successive generations by example, instruction and training. It is the product of the three human capacities of verbal-conceptual interpretation, practical invention, and emotional expression with aesthetic perception, which are not only communicative but may be creative as well. Because they combine in unique fashion the two characteristics of communicativeness and original creation, these three capacities are the agencies of co-operative construction by man, and determine the principal fields of his cultural achievement,

(1) those of intellectual interpretation and discovery including traditional lore, history, philosophy and science, (2) of practical contrivance and invention including industrial implements and techniques, weapons of defense and warfare, forms of political organization, and (3) of artistic creation including fine art products of all kinds,—with many culture-products like religion, kinship systems, and magic, falling in more than one field (17, p. 216). These multitudinous accumulated products of the joint activities of preceding generations of his fellows do not merely exist for the group-member to take an interest in, or not, as his own fancy or external circumstance may dictate. Very early in life, social norms and culture products acquire authoritative value for the individual, and such super-ego values govern and shape his daily behavior and personal development. They do this not by separate action as a miscellany of customs, standards, cultural objects, etc., but as anthropologists have recently reminded us, by mutual support and reinforcement as a dynamic culture-pattern in which, *e.g.*, magical rites embellished by art-products might support industrial techniques and play a part in initiation ceremonies, while these latter afforded some preparation for the rigors of warfare and the duties of family life.

It is important to see that social culture products which exercise this influence and authority over individual behavior do not gain this controlling power merely by acting as collections of stimuli which through conditioning, reinforced by the rewards and penalties of family discipline and the effects of adult prestige suggestion, come to be effective in evoking socially adaptive responses. It is instead true, as Sherif has proved (13), that we cannot explain the dominant influence and lasting authority of social norms without taking account of the meaning they have for the growing individual. If their influence in the socio-psychological field is to be rightly understood, they must, as he says, be taken 'on their own level' as signifying modes of relationship within a dynamic context (13, p. 59). This is not simply the behavioral context of need-fulfilling objects and goal-directed activities, of

pathways and instruments, of obstacles and detours. It is the social context of inter-communicating and inter-acting, of competing and co-operating selves. If, then, cultural objects are to be assimilated, interiorized, by the growing individual, and come to function as the frame of reference which determines his beliefs, influences his perceptions, shapes his memories and governs his acts, then their meaning must in some degree be understood by him (13, p. 130). Such understanding may be very slight, very imperfect, on first contact in early life. Admittedly the child learns first to conform to social standards, and to employ culture products from mechanical appliances to language forms, principally by conditioning and imitation, and with little insight into their social meaning. But such insight, not entirely absent at the start, is bound to increase as the years of childhood pass and social experience matures. Thus in the boys' marble game of Piaget's well-known study (11), the younger boys understood the rules as something to be obeyed if one was admitted to play and as deriving their authority presumably from some adult source, teachers, fathers or grandfathers. But as they grew older the boys came to see with increasing clearness the connection between the authority of the rules and their social function, until at the age of ten or twelve the average boy understood quite well that the rules had to be obeyed because such compliance on the part of all participants was the necessary condition of there being any game between equals.

The existence of a behavioral (at least in the sense of physical), and a social, environment would be acknowledged as obvious by all psychologists, although equally unanimous assent would scarcely be given to the further statement that these two environments are at once psychologically meaningful and objectively existent. But there is another context not generally recognized even in name by psychologists. This is that of the real world in the comprehensive sense, the cosmic environment. The scientific student of human behavior who affirms the existence and operation of a third such context must be prepared to answer the question: With

what activities or capacities of the human organism is this 'cosmic' context functionally inter-related? It is a question which can, I think, be quite definitely answered. They are the three psycho-physical capacities already found to be operative in the organization of the world of social community and social culture: articulate speech, manual contrivance and practical invention, and emotional expression. These capacities have been said to be creative and communicative. But they have, in addition, a third distinctive and notable characteristic. They are responses not only to adjacent and surrounding objects, and to other persons in the social community, but also and uniquely, to the real world as the cosmic frame and setting of all human life and activity. They are therefore governed in their activity by conditions set by the nature of the real world, and their continued exercise proceeds in functional relation with the unfolding of the cosmic context of human behavior. Man's verbal-conceptual activity is a response to the consistency of generalized character, the permanence of orderly relation, in the real world—to the fact that its component objects show similarities of quality and quantity which are more or less stable and give it a coherent structure which can be successfully explored by consecutive, logically consistent thought. The capacity for practical contrivance and invention is a response to the dynamic potencies of the real world—to the fact that existing forces and materials are uniform in mode of causal operation and are capable when combined and adjusted of producing by joint action new and humanly useful results. The emotional-aesthetic response is evoked by significant patterns of sense-imagery presented by the real world, primarily in the form of natural scenery and social episode and, secondarily, in the creations of human art.

But do we not take cognizance of the essential facts, it may be asked, if we admit that science, art, technology and religion, the human pursuits most directly concerned with the real universe; its constitution, forces, and meaning, form part of the social culture of man, and consequently fall within the social context as previously described? It is true that psy-

chologists and sociologists have accorded to these pursuits an important and honorable place, sometimes dignifying them as 'higher,' perhaps even as 'spiritual,' interests of human culture. They have been represented as appropriate goal-interests for instinctive desire when re-directed in the process called sublimation. They have been classed by Kardiner as secondary institutions which perform the indispensable social function of releasing the tensions engendered by the disciplines necessarily imposed by the primary institutions (6, p. 476). We may be reminded that the three activities, verbal-intellectual, technological, and emotional-aesthetic, which are now declared to operate in functional interdependence with the cosmic context are the same ones which were previously said to be chiefly responsible for social culture as a co-operative human achievement. What is important to notice in the present connection, however, is the reason why these three activities are instrumental in the production of social culture. In accounting for their efficiency in the cultural field emphasis was laid upon their constructive-communicative character. The part which these activities have played in the cultural attainments of mankind is also and in large part due to the further fact that they, being responses to the structural aspects of the real world, establish fields of performance constituted as much by the order and framework of nature as by the anatomical peculiarities of the human organism. It follows that the creative efforts of individuals in the fields dominated by these activities are estimated as to adequacy and success largely by objective standards authoritative for all individuals because inherent in the world-setting of these fields, and not entirely by criteria determined by the tastes, desires and likings of individuals, or by the interests and ambitions of groups which are invariably diverse and frequently conflicting. If one is to contribute as thinker to the stock of tribal lore or the system of recorded knowledge, his statements must be in agreement with fact and consistent with themselves and other well-founded statements. If he is to be successful as mechanical inventor or political innovator, he must comply with requirements of

efficiency and economy dictated by the forces and materials with which he works. If he is to be successful as an artist, he must observe the conditions for meaningful expression imposed by the medium in which he works.

That these three activities of verbal-conceptual interpretation, practical invention, and artistic creation, have been responsible for man's social culture chiefly because they are subject to objective criteria of successful attainment which are authoritative for all workers, bears witness, therefore, to the fact which now concerns us, that they are responses to the real world. In the field of social culture, as we know, the individual worker, whether sage, craftsman, technician, administrator or artist, observes the objectively determined standards for production in his line, in order to bring into existence some special object which appeals to him as of particular interest, value, or utility. What this special object may be depends upon the time and circumstances of his own work, and upon the character of the group-life in which he participates. But the three capacities usually employed in cultural production may be exercised in a different way. Each may be said to have an interest and aim implicit in itself and consequently to be an original source of appeal, aspiration and value, and each may be exercised in an effort to attain its own intrinsically attractive goal. The goal of the first is to discover all that can be found out about the nature and constitution of the real world including mankind, of the second is to gain increased control over the forces of nature, both physical and bio-social, to direct their power and exploit their resources for intelligent ends, of the third, to appreciate and portray the beauties of patterned imagery presented by the panorama of nature and the course of human social life. When these three capacities are thus exercised in pursuit of their distinctive goals, scientific, technological and aesthetic, they can operate only in functional interdependence with an environmental system dynamically structured, and this is the real universe, or cosmic context. Included in the real world, of course, is the behavior of human beings, subject-matter of psychology. That the psychologist

cannot entirely exclude from the purview of his science the cosmic context and the ontological questions it raises, has been lately pointed out by Weber in a critique of operationism in psychology (14). "The object of knowledge," he concludes, "cannot be incorporated in the operations by which we know it." The operationist should remember "that there is a realm of realities which determine what his choice of operations must be." "There is a realm of brute requiredness which cannot be liquidated by the simple device of identifying operations and concepts. Operationism of this sort may ignore the systematic order, or lack of it, in the things upon which operations are made, but the systematic order or lack of it will reappear amongst the operations. The 'shocks' which we experience when we see that concepts fail to fit the realities are indeed precious experiences which keep science going. When we note such inconsistencies we renew our efforts to restore system. We are always under the necessity of assuming that the inter-locking system is there, and that it is our business to find it" (14, pp. 66, 67).

That these three contexts, behavioral, social and cosmic, have much in common, both in respect to component objects and mode of dynamic organization, and are to a large extent overlapping, is certainly true. The behavioral world has its quasi-social aspect: other human individuals engage along with inanimate objects in the behavioral world of the young child. They possess valence, either as offering satisfaction to the needs for food and shelter, for loving contact and affectionate ministrations, or indirectly, as affording help, or interposing barriers, to the attainment of other goals. It is equally clear that the social context may in one of its aspects be viewed as the world of perception and of work in which persons, whether individuals or groups or classes of individuals, and objects of human interest and concern, are organized by the parts they play, either as goals, or as instruments, boundaries, or barriers. Similarly, with respect to cosmic and social contexts, it is true as we have seen, that the content of the cosmic context, the structure of the real world, the laws of its operation, the potencies of its forces, the pat-

turning of its sense-imagery—all must enter the calculations of associated human workers in the various fields of cultural activity. On the other hand, it is undeniable that the goal-objects distinctive of the cosmic context, scientific knowledge, technological mastery, and artistic creation, must be pursued co-operatively, and that their co-operative pursuit associates human individuals in a most satisfying form of comradeship. In view of these facts, one may wonder why these contexts are distinguished from one another and held to possess each a separate identity. Do they not all merge into the one admittedly complex, but at the same time unitary, environment of all human behavior? In answering this objection, it is sufficient to cite those differences in the make-up of these three fields, particularly in the character of their component objects, which justify us, I think, in ascribing to each a separate identity. The behavioral context is composed of perceived objects in relation to the need-impelled and goal-directed activities of the human organism, the social context revolves around the self, other persons, and those goal-objects which owe their appeal to the interaction and inter-relation of communicating selves, the cosmic context is inclusive of the real world in those features which make it intelligible, adaptable, and aesthetically significant to the intelligence of man.

Can it be said that these three contexts are related genetically, as representing progressive stages in the development of human action to levels of greater adequacy? Roughly speaking, the three contexts appear in temporal sequence in human life-history. The behavioral is dominant in early childhood, the social is not fully emergent until adolescence, and the cosmic in any definite form awaits upon maturity. More significant as indicative of real development is the fact that the three contexts as named fall into an order of increasing range and inclusiveness. The behavioral context is for the most part (although not quite entirely) limited to the perceived present. The social context has certainly a much wider range both in space and time. The existence, attitudes, and enterprises of other persons in places far distant

influence the behavior of the individual self, and his own interests and plans explicitly relate to his past experience and may embrace within their scope the future, near or far. The cosmic context, including the real world in its setting of universal evolution, is, at least in the framework it provides, all-comprehensive. Consistent with the idea of stages in the progressive disclosure of the objective environment which conditions all human behavior, is the further fact that objects and features characteristic of a certain level are to be found in simpler, as it were anticipatory form, in the earlier, more limited context. Thus, while selves involving personal relations are operative agencies characteristic of the social context, human individuals, particularly as sources of prohibitions and permissions, rewards and penalties, are important dynamic factors in the behavioral world. Again, while coherence of structure and uniformity of causal determination are distinctive features of the cosmic context, they make preliminary appearance as operative influences in the social world of the child who advances from the ego-centrism and animism of early childhood to the comparatively objective and realistic outlook of youth.

So there would appear to be sufficient ground for regarding these three contexts as stages in the progressive development of the psychological environment which accompanies and conditions the maturing of human personality. Does this mean that in the course of personal development the later and wider environment includes and supersedes the earlier, more rudimentary? To a considerable extent, this is true, *e.g.*, the social context assimilates the behavioral, translating it into terms of its own dynamic structure. But there are decided limits and many exceptions to this. Even the mature personality acts at different times on different levels, in functional interdependence with different environments. As we all know, human beings, under pressure of sudden danger or urgent organic need, often disregard the restrictions of social propriety and civic duty which ordinarily govern their behavior and attempt with ruthless directness to obtain what they need and want. And the man who has given years to

the comparatively disinterested pursuit of truth or artistic perfection may be led to abandon or fatally compromise these standards by the desire for popular acclaim and easy money. These are stock illustrations of an extreme sort, doubtless, but it is certain that many shifts in orientation from one context to another with accompanying change of standards occur in the lives of people of developed personality and stable character. Variety is added to life thereby; 'letting down' is often a means of beneficial relaxation; perhaps the 'moral holiday' idea has some relevance here. Whether we have in this growing inclusiveness of the experienced world, along with the wider range of effective response it makes possible, the scientific principle of psychological growth may be open to question. Griffith, in the article referred to above, thinks not, although agreeing that the wider the range of the behavioral environment the wiser and the more useful the reaction (3, p. 218). Whatever one may think about the fundamental principle of psychological genesis, there is no doubt that the maturing of human personality is conditioned by the progressive enlargement of that psychological environment in dynamic inter-relation with which the individual strives for self-expression and self-satisfaction.

Summary.—The two outstanding features of meaning, (1) that it depends upon organizing relationships between the meaningful object and other objects and (2) that it is operative in determining behavior, can be explained only in terms of a psychological environment, spatially and dynamically structured, which conditions the behavior of the individual. In human behavior, three such environmental contexts can be distinguished both by the object-items which compose them and the mode of their dynamic organization. The 'behavioral' context is composed of perceived objects in relation to the need-impelled and goal-directed activities of the percipient, objects which influence individual behavior either directly because they promise satisfaction of organic need, or indirectly, because they offer pathways, interpose obstacles and make necessary detours, or are available as instruments in goal-directed action. The second or social context is com-

posed of inter-communicating and interacting selves along with those cultural objects (institutions, standards, and culture-products, intellectual, technological and artistic) by which the co-operative and competitive activities of group-members are guided and controlled. The third or cosmic context consists of the objects of the real world which, in their coherence of character, causal efficacy and patterned sense-imagery, appeal to the minds of men as intelligible, adaptable and aesthetically significant, and impel them to the pursuit of knowledge, technological mastery, and the beauties of art. These three contexts, in order named, are increasingly comprehensive, and operate in dynamic interdependence with human activities of progressively greater scope and range. The maturing of human personality involves, and depends upon, such a progressive widening of the psychological environment.

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A THEORY OF HUMAN MOTIVATION

BY A. H. MASLOW

Brooklyn College

I. INTRODUCTION

In a previous paper (13) various propositions were presented which would have to be included in any theory of human motivation that could lay claim to being definitive. These conclusions may be briefly summarized as follows:

1. The integrated wholeness of the organism must be one of the foundation stones of motivation theory.
2. The hunger drive (or any other physiological drive) was rejected as a centering point or model for a definitive theory of motivation. Any drive that is somatically based and localizable was shown to be atypical rather than typical in human motivation.
3. Such a theory should stress and center itself upon ultimate or basic goals rather than partial or superficial ones, upon ends rather than means to these ends. Such a stress would imply a more central place for unconscious than for conscious motivations.
4. There are usually available various cultural paths to the same goal. Therefore conscious, specific, local-cultural desires are not as fundamental in motivation theory as the more basic, unconscious goals.
5. Any motivated behavior, either preparatory or consummatory, must be understood to be a channel through which many basic needs may be simultaneously expressed or satisfied. Typically an act has *more* than one motivation.
6. Practically all organismic states are to be understood as motivated and as motivating.
7. Human needs arrange themselves in hierarchies of prepotency. That is to say, the appearance of one need usually rests on the prior satisfaction of another, more pre-potent need. Man is a perpetually wanting animal. Also no need or drive can be treated as if it were isolated or discrete; every drive is related to the state of satisfaction or dissatisfaction of other drives.
8. *Lists* of drives will get us nowhere for various theoretical and practical reasons. Furthermore any classification of motivations

must deal with the problem of levels of specificity or generalization of the motives to be classified.

9. Classifications of motivations must be based upon goals rather than upon instigating drives or motivated behavior.

10. Motivation theory should be human-centered rather than animal-centered.

11. The situation or the field in which the organism reacts must be taken into account but the field alone can rarely serve as an exclusive explanation for behavior. Furthermore the field itself must be interpreted in terms of the organism. Field theory cannot be a substitute for motivation theory.

12. Not only the integration of the organism must be taken into account, but also the possibility of isolated, specific, partial or segmental reactions.

It has since become necessary to add to these another affirmation.

13. Motivation theory is not synonymous with behavior theory. The motivations are only one class of determinants of behavior. While behavior is almost always motivated, it is also almost always biologically, culturally and situationally determined as well.

The present paper is an attempt to formulate a positive theory of motivation which will satisfy these theoretical demands and at the same time conform to the known facts, clinical and observational as well as experimental. It derives most directly, however, from clinical experience. This theory is, I think, in the functionalist tradition of James and Dewey, and is fused with the holism of Wertheimer (19), Goldstein (6), and Gestalt Psychology, and with the dynamicism of Freud (4) and Adler (1). This fusion or synthesis may arbitrarily be called a 'general-dynamic' theory.

It is far easier to perceive and to criticize the aspects in motivation theory than to remedy them. Mostly this is because of the very serious lack of sound data in this area. I conceive this lack of sound facts to be due primarily to the absence of a valid theory of motivation. The present theory then must be considered to be a suggested program or framework for future research and must stand or fall, not so much on facts available or evidence presented, as upon researches yet to be done, researches suggested perhaps, by the questions raised in this paper.

II. THE BASIC NEEDS

The 'physiological' needs.—The needs that are usually taken as the starting point for motivation theory are the so-called physiological drives. Two recent lines of research make it necessary to revise our customary notions about these needs, first, the development of the concept of homeostasis, and second, the finding that appetites (preferential choices among foods) are a fairly efficient indication of actual needs or lacks in the body.

Homeostasis refers to the body's automatic efforts to maintain a constant, normal state of the blood stream. Cannon (2) has described this process for (1) the water content of the blood, (2) salt content, (3) sugar content, (4) protein content, (5) fat content, (6) calcium content, (7) oxygen content, (8) constant hydrogen-ion level (acid-base balance) and (9) constant temperature of the blood. Obviously this list can be extended to include other minerals, the hormones, vitamins, etc.

Young in a recent article (21) has summarized the work on appetite in its relation to body needs. If the body lacks some chemical, the individual will tend to develop a specific appetite or partial hunger for that food element.

Thus it seems impossible as well as useless to make any list of fundamental physiological needs for they can come to almost any number one might wish, depending on the degree of specificity of description. We can not identify all physiological needs as homeostatic. That sexual desire, sleepiness, sheer activity and maternal behavior in animals, are homeostatic, has not yet been demonstrated. Furthermore, this list would not include the various sensory pleasures (tastes, smells, tickling, stroking) which are probably physiological and which may become the goals of motivated behavior.

In a previous paper (13) it has been pointed out that these physiological drives or needs are to be considered unusual rather than typical because they are isolable, and because they are localizable somatically. That is to say, they are relatively independent of each other, of other motivations

and of the organism as a whole, and secondly, in many cases, it is possible to demonstrate a localized, underlying somatic base for the drive. This is true less generally than has been thought (exceptions are fatigue, sleepiness, maternal responses) but it is still true in the classic instances of hunger, sex, and thirst.

It should be pointed out again that any of the physiological needs and the consummatory behavior involved with them serve as channels for all sorts of other needs as well. That is to say, the person who thinks he is hungry may actually be seeking more for comfort, or dependence, than for vitamins or proteins. Conversely, it is possible to satisfy the hunger need in part by other activities such as drinking water or smoking cigarettes. In other words, relatively isolable as these physiological needs are, they are not completely so.

Undoubtedly these physiological needs are the most potent of all needs. What this means specifically is, that in the human being who is missing everything in life in an extreme fashion, it is most likely that the major motivation would be the physiological needs rather than any others. A person who is lacking food, safety, love, and esteem would most probably hunger for food more strongly than for anything else.

If all the needs are unsatisfied, and the organism is then dominated by the physiological needs, all other needs may become simply non-existent or be pushed into the background. It is then fair to characterize the whole organism by saying simply that it is hungry, for consciousness is almost completely preempted by hunger. All capacities are put into the service of hunger-satisfaction, and the organization of these capacities is almost entirely determined by the one purpose of satisfying hunger. The receptors and effectors, the intelligence, memory, habits, all may now be defined simply as hunger-gratifying tools. Capacities that are not useful for this purpose lie dormant, or are pushed into the background. The urge to write poetry, the desire to acquire an automobile, the interest in American history, the desire for a new pair of shoes are, in the extreme case, forgotten or become of sec-

ondary importance. For the man who is extremely and dangerously hungry, no other interests exist but food. He dreams food, he remembers food, he thinks about food, he emotes only about food, he perceives only food and he wants only food. The more subtle determinants that ordinarily fuse with the physiological drives in organizing even feeding, drinking or sexual behavior, may now be so completely overwhelmed as to allow us to speak at this time (but *only* at this time) of pure hunger drive and behavior, with the one unqualified aim of relief.

Another peculiar characteristic of the human organism when it is dominated by a certain need is that the whole philosophy of the future tends also to change. For our chronically and extremely hungry man, Utopia can be defined very simply as a place where there is plenty of food. He tends to think that, if only he is guaranteed food for the rest of his life, he will be perfectly happy and will never want anything more. Life itself tends to be defined in terms of eating. Anything else will be defined as unimportant. Freedom, love, community feeling, respect, philosophy, may all be waved aside as fripperies which are useless since they fail to fill the stomach. Such a man may fairly be said to live by bread alone.

It cannot possibly be denied that such things are true but their *generality* can be denied. Emergency conditions are, almost by definition, rare in the normally functioning peaceful society. That this truism can be forgotten is due mainly to two reasons. First, rats have few motivations other than physiological ones, and since so much of the research upon motivation has been made with these animals, it is easy to carry the rat-picture over to the human being. Secondly, it is too often not realized that culture itself is an adaptive tool, one of whose main functions is to make the physiological emergencies come less and less often. In most of the known societies, chronic extreme hunger of the emergency type is rare, rather than common. In any case, this is still true in the United States. The average American citizen is experiencing appetite rather than hunger when he says "I am

hungry." He is apt to experience sheer life-and-death hunger only by accident and then only a few times through his entire life.

Obviously a good way to obscure the 'higher' motivations, and to get a lopsided view of human capacities and human nature, is to make the organism extremely and chronically hungry or thirsty. Anyone who attempts to make an emergency picture into a typical one, and who will measure all of man's goals and desires by his behavior during extreme physiological deprivation is certainly being blind to many things. It is quite true that man lives by bread alone—when there is no bread. But what happens to man's desires when there *is* plenty of bread and when his belly is chronically filled?

At once other (and 'higher') needs emerge and these, rather than physiological hungers, dominate the organism. And when these in turn are satisfied, again new (and still 'higher') needs emerge and so on. This is what we mean by saying that the basic human needs are organized into a hierarchy of relative prepotency.

One main implication of this phrasing is that gratification becomes as important a concept as deprivation in motivation theory, for it releases the organism from the domination of a relatively more physiological need, permitting thereby the emergence of other more social goals. The physiological needs, along with their partial goals, when chronically gratified cease to exist as active determinants or organizers of behavior. They now exist only in a potential fashion in the sense that they may emerge again to dominate the organism if they are thwarted. But a want that is satisfied is no longer a want. The organism is dominated and its behavior organized only by unsatisfied needs. If hunger is satisfied, it becomes unimportant in the current dynamics of the individual.

This statement is somewhat qualified by a hypothesis to be discussed more fully later, namely that it is precisely those individuals in whom a certain need has always been satisfied who are best equipped to tolerate deprivation of that need in the future, and that furthermore, those who have been de-

prived in the past will react differently to current satisfactions than the one who has never been deprived.

The safety needs.—If the physiological needs are relatively well gratified, there then emerges a new set of needs, which we may categorize roughly as the safety needs. All that has been said of the physiological needs is equally true, although in lesser degree, of these desires. The organism may equally well be wholly dominated by them. They may serve as the almost exclusive organizers of behavior, recruiting all the capacities of the organism in their service, and we may then fairly describe the whole organism as a safety-seeking mechanism. Again we may say of the receptors, the effectors, of the intellect and the other capacities that they are primarily safety-seeking tools. Again, as in the hungry man, we find that the dominating goal is a strong determinant not only of his current world-outlook and philosophy but also of his philosophy of the future. Practically everything looks less important than safety, (even sometimes the physiological needs which being satisfied, are now underestimated). A man, in this state, if it is extreme enough and chronic enough, may be characterized as living almost for safety alone.

Although in this paper we are interested primarily in the needs of the adult, we can approach an understanding of his safety needs perhaps more efficiently by observation of infants and children, in whom these needs are much more simple and obvious. One reason for the clearer appearance of the threat or danger reaction in infants, is that they do not inhibit this reaction at all, whereas adults in our society have been taught to inhibit it at all costs. Thus even when adults do feel their safety to be threatened we may not be able to see this on the surface. Infants will react in a total fashion and as if they were endangered, if they are disturbed or dropped suddenly, startled by loud noises, flashing light, or other unusual sensory stimulation, by rough handling, by general loss of support in the mother's arms, or by inadequate support.¹

¹ As the child grows up, sheer knowledge and familiarity as well as better motor development make these 'dangers' less and less dangerous and more and more man-

In infants we can also see a much more direct reaction to bodily illnesses of various kinds. Sometimes these illnesses seem to be immediately and *per se* threatening and seem to make the child feel unsafe. For instance, vomiting, colic or other sharp pains seem to make the child look at the whole world in a different way. At such a moment of pain, it may be postulated that, for the child, the appearance of the whole world suddenly changes from sunniness to darkness, so to speak, and becomes a place in which anything at all might happen, in which previously stable things have suddenly become unstable. Thus a child who because of some bad food is taken ill may, for a day or two, develop fear, nightmares, and a need for protection and reassurance never seen in him before his illness.

Another indication of the child's need for safety is his preference for some kind of undisrupted routine or rhythm. He seems to want a predictable, orderly world. For instance, injustice, unfairness, or inconsistency in the parents seems to make a child feel anxious and unsafe. This attitude may be not so much because of the injustice *per se* or any particular pains involved, but rather because this treatment threatens to make the world look unreliable, or unsafe, or unpredictable. Young children seem to thrive better under a system which has at least a skeletal outline of rigidity, in which there is a schedule of a kind, some sort of routine, something that can be counted upon, not only for the present but also far into the future. Perhaps one could express this more accurately by saying that the child needs an organized world rather than an unorganized or unstructured one.

The central role of the parents and the normal family setup are indisputable. Quarreling, physical assault, separation, divorce or death within the family may be particularly terrifying. Also parental outbursts of rage or threats of punishment directed to the child, calling him names, speaking to him harshly, shaking him, handling him roughly, or actual ageable. Throughout life it may be said that one of the main conative functions of education is this neutralizing of apparent dangers through knowledge, *e.g.*, I am not afraid of thunder because I know something about it.

physical punishment sometimes elicit such total panic and terror in the child that we must assume more is involved than the physical pain alone. While it is true that in some children this terror may represent also a fear of loss of parental love, it can also occur in completely rejected children, who seem to cling to the hating parents more for sheer safety and protection than because of hope of love.

Confronting the average child with new, unfamiliar, strange, unmanageable stimuli or situations will too frequently elicit the danger or terror reaction, as for example, getting lost or even being separated from the parents for a short time, being confronted with new faces, new situations or new tasks, the sight of strange, unfamiliar or uncontrollable objects, illness or death. Particularly at such times, the child's frantic clinging to his parents is eloquent testimony to their role as protectors (quite apart from their roles as food-givers and love-givers).

From these and similar observations, we may generalize and say that the average child in our society generally prefers a safe, orderly, predictable, organized world, which he can count on, and in which unexpected, unmanageable or other dangerous things do not happen, and in which, in any case, he has all-powerful parents who protect and shield him from harm.

That these reactions may so easily be observed in children is in a way a proof of the fact that children in our society, feel too unsafe (or, in a word, are badly brought up). Children who are reared in an unthreatening, loving family do *not* ordinarily react as we have described above (17). In such children the danger reactions are apt to come mostly to objects or situations that adults too would consider dangerous.²

The healthy, normal, fortunate adult in our culture is largely satisfied in his safety needs. The peaceful, smoothly

² A 'test battery' for safety might be confronting the child with a small exploding firecracker, or with a bewhiskered face, having the mother leave the room, putting him upon a high ladder, a hypodermic injection, having a mouse crawl up to him, etc. Of course I cannot seriously recommend the deliberate use of such 'tests' for they might very well harm the child being tested. But these and similar situations come up by the score in the child's ordinary day-to-day living and may be observed. There is no reason why these stimuli should not be used with, for example, young chimpanzees.

running, 'good' society ordinarily makes its members feel safe enough from wild animals, extremes of temperature, criminals, assault and murder, tyranny, etc. Therefore, in a very real sense, he no longer has any safety needs as active motivators. Just as a sated man no longer feels hungry, a safe man no longer feels endangered. If we wish to see these needs directly and clearly we must turn to neurotic or near-neurotic individuals, and to the economic and social underdogs. In between these extremes, we can perceive the expressions of safety needs only in such phenomena as, for instance, the common preference for a job with tenure and protection, the desire for a savings account, and for insurance of various kinds (medical, dental, unemployment, disability, old age).

Other broader aspects of the attempt to seek safety and stability in the world are seen in the very common preference for familiar rather than unfamiliar things, or for the known rather than the unknown. The tendency to have some religion or world-philosophy that organizes the universe and the men in it into some sort of satisfactorily coherent, meaningful whole is also in part motivated by safety-seeking. Here too we may list science and philosophy in general as partially motivated by the safety needs (we shall see later that there are also other motivations to scientific, philosophical or religious endeavor).

Otherwise the need for safety is seen as an active and dominant mobilizer of the organism's resources only in emergencies, *e.g.*, war, disease, natural catastrophes, crime waves, societal disorganization, neurosis, brain injury, chronically bad situation.

Some neurotic adults in our society are, in many ways, like the unsafe child in their desire for safety, although in the former it takes on a somewhat special appearance. Their reaction is often to unknown, psychological dangers in a world that is perceived to be hostile, overwhelming and threatening. Such a person behaves as if a great catastrophe were almost always impending, *i.e.*, he is usually responding as if to an emergency. His safety needs often find specific

expression in a search for a protector, or a stronger person on whom he may depend, or perhaps, a Fuehrer.

The neurotic individual may be described in a slightly different way with some usefulness as a grown-up person who retains his childish attitudes toward the world. That is to say, a neurotic adult may be said to behave 'as if' he were actually afraid of a spanking, or of his mother's disapproval, or of being abandoned by his parents, or having his food taken away from him. It is as if his childish attitudes of fear and threat reaction to a dangerous world had gone underground, and untouched by the growing up and learning processes, were now ready to be called out by any stimulus that would make a child feel endangered and threatened.³

The neurosis in which the search for safety takes its clearest form is in the compulsive-obsessive neurosis. Compulsive-obsessives try frantically to order and stabilize the world so that no unmanageable, unexpected or unfamiliar dangers will ever appear (14). They hedge themselves about with all sorts of ceremonials, rules and formulas so that every possible contingency may be provided for and so that no new contingencies may appear. They are much like the brain injured cases, described by Goldstein (6), who manage to maintain their equilibrium by avoiding everything unfamiliar and strange and by ordering their restricted world in such a neat, disciplined, orderly fashion that everything in the world can be counted upon. They try to arrange the world so that anything unexpected (dangers) cannot possibly occur. If, through no fault of their own, something unexpected does occur, they go into a panic reaction as if this unexpected occurrence constituted a grave danger. What we can see only as a none-too-strong preference in the healthy person, e.g., preference for the familiar, becomes a life-and-death necessity in abnormal cases.

The love needs.—If both the physiological and the safety needs are fairly well gratified, then there will emerge the love and affection and belongingness needs, and the whole cycle

³ Not all neurotic individuals feel unsafe. Neurosis may have at its core a thwarting of the affection and esteem needs in a person who is generally safe.

already described will repeat itself with this new center. Now the person will feel keenly, as never before, the absence of friends, or a sweetheart, or a wife, or children. He will hunger for affectionate relations with people in general, namely, for a place in his group, and he will strive with great intensity to achieve this goal. He will want to attain such a place more than anything else in the world and may even forget that once, when he was hungry, he sneered at love.

In our society the thwarting of these needs is the most commonly found core in cases of maladjustment and more severe psychopathology. Love and affection, as well as their possible expression in sexuality, are generally looked upon with ambivalence and are customarily hedged about with many restrictions and inhibitions. Practically all theorists of psychopathology have stressed thwarting of the love needs as basic in the picture of maladjustment. Many clinical studies have therefore been made of this need and we know more about it perhaps than any of the other needs except the physiological ones (14).

One thing that must be stressed at this point is that love is not synonymous with sex. Sex may be studied as a purely physiological need. Ordinarily sexual behavior is multi-determined, that is to say, determined not only by sexual but also by other needs, chief among which are the love and affection needs. Also not to be overlooked is the fact that the love needs involve both giving *and* receiving love.⁴

The esteem needs.—All people in our society (with a few pathological exceptions) have a need or desire for a stable, firmly based, (usually) high evaluation of themselves, for self-respect, or self-esteem, and for the esteem of others. By firmly based self-esteem, we mean that which is soundly based upon real capacity, achievement and respect from others. These needs may be classified into two subsidiary sets. These are, first, the desire for strength, for achievement, for adequacy, for confidence in the face of the world, and for independence and freedom.⁵ Secondly, we have what

⁴ For further details see (12) and (16, Chap. 5).

⁵ Whether or not this particular desire is universal we do not know. The crucial question, especially important today, is "Will men who are enslaved and dominated,

we may call the desire for reputation or prestige (defining it as respect or esteem from other people), recognition, attention, importance or appreciation.⁶ These needs have been relatively stressed by Alfred Adler and his followers, and have been relatively neglected by Freud and the psychoanalysts. More and more today however there is appearing widespread appreciation of their central importance.

Satisfaction of the self-esteem need leads to feelings of self-confidence, worth, strength, capability and adequacy of being useful and necessary in the world. But thwarting of these needs produces feelings of inferiority, of weakness and of helplessness. These feelings in turn give rise to either basic discouragement or else compensatory or neurotic trends. An appreciation of the necessity of basic self-confidence and an understanding of how helpless people are without it, can be easily gained from a study of severe traumatic neurosis (8).⁷

The need for self-actualization.—Even if all these needs are satisfied, we may still often (if not always) expect that a new discontent and restlessness will soon develop, unless the individual is doing what he is fitted for. A musician must make music, an artist must paint, a poet must write, if he is to be ultimately happy. What a man *can* be, he *must* be. This need we may call self-actualization.

This term, first coined by Kurt Goldstein, is being used in this paper in a much more specific and limited fashion. It refers to the desire for self-fulfillment, namely, to the tendency for him to become actualized in what he is potentially. This tendency might be phrased as the desire to become more and more what one is, to become everything that one is capable of becoming.

inevitably feel dissatisfied and rebellious?" We may assume on the basis of commonly known clinical data that a man who has known true freedom (not paid for by giving up safety and security but rather built on the basis of adequate safety and security) will not willingly or easily allow his freedom to be taken away from him. But we do not know that this is true for the person born into slavery. The events of the next decade should give us our answer. See discussion of this problem in (5).

⁶ Perhaps the desire for prestige and respect from others is subsidiary to the desire for self-esteem or confidence in oneself. Observation of children seems to indicate that this is so, but clinical data give no clear support for such a conclusion.

⁷ For more extensive discussion of normal self-esteem, as well as for reports of various researches, see (11).

The specific form that these needs will take will of course vary greatly from person to person. In one individual it may take the form of the desire to be an ideal mother, in another it may be expressed athletically, and in still another it may be expressed in painting pictures or in inventions. It is not necessarily a creative urge although in people who have any capacities for creation it will take this form.

The clear emergence of these needs rests upon prior satisfaction of the physiological, safety, love and esteem needs. We shall call people who are satisfied in these needs, basically satisfied people, and it is from these that we may expect the fullest (and healthiest) creativeness.⁸ Since, in our society, basically satisfied people are the exception, we do not know much about self-actualization, either experimentally or clinically. It remains a challenging problem for research.

The preconditions for the basic need satisfactions.—There are certain conditions which are immediate prerequisites for the basic need satisfactions. Danger to these is reacted to almost as if it were a direct danger to the basic needs themselves. Such conditions as freedom to speak, freedom to do what one wishes so long as no harm is done to others, freedom to express one's self, freedom to investigate and seek for information, freedom to defend one's self, justice, fairness, honesty, orderliness in the group are examples of such preconditions for basic need satisfactions. Thwarting in these freedoms will be reacted to with a threat or emergency response. These conditions are not ends in themselves but they are *almost* so since they are so closely related to the basic needs, which are apparently the only ends in themselves. These conditions are defended because without them the basic satisfactions are quite impossible, or at least, very severely endangered.

⁸ Clearly creative behavior, like painting, is like any other behavior in having multiple determinants. It may be seen in 'innately creative' people whether they are satisfied or not, happy or unhappy, hungry or sated. Also it is clear that creative activity may be compensatory, ameliorative or purely economic. It is my impression (as yet unconfirmed) that it is possible to distinguish the artistic and intellectual products of basically satisfied people from those of basically unsatisfied people by inspection alone. In any case, here too we must distinguish, in a dynamic fashion, the overt behavior itself from its various motivations or purposes.

If we remember that the cognitive capacities (perceptual, intellectual, learning) are a set of adjustive tools, which have, among other functions, that of satisfaction of our basic needs, then it is clear that any danger to them, any deprivation or blocking of their free use, must also be indirectly threatening to the basic needs themselves. Such a statement is a partial solution of the general problems of curiosity, the search for knowledge, truth and wisdom, and the ever-persistent urge to solve the cosmic mysteries.

We must therefore introduce another hypothesis and speak of degrees of closeness to the basic needs, for we have already pointed out that *any* conscious desires (partial goals) are more or less important as they are more or less close to the basic needs. The same statement may be made for various behavior acts. An act is psychologically important if it contributes directly to satisfaction of basic needs. The less directly it so contributes, or the weaker this contribution is, the less important this act must be conceived to be from the point of view of dynamic psychology. A similar statement may be made for the various defense or coping mechanisms. Some are very directly related to the protection or attainment of the basic needs, others are only weakly and distantly related. Indeed if we wished, we could speak of more basic and less basic defense mechanisms, and then affirm that danger to the more basic defenses is more threatening than danger to less basic defenses (always remembering that this is so only because of their relationship to the basic needs).

The desires to know and to understand.—So far, we have mentioned the cognitive needs only in passing. Acquiring knowledge and systematizing the universe have been considered as, in part, techniques for the achievement of basic safety in the world, or, for the intelligent man, expressions of self-actualization. Also freedom of inquiry and expression have been discussed as preconditions of satisfactions of the basic needs. True though these formulations may be, they do not constitute definitive answers to the question as to the motivation role of curiosity, learning, philosophizing, experimenting, etc. They are, at best, no more than partial answers.

This question is especially difficult because we know so little about the facts. Curiosity, exploration, desire for the facts, desire to know may certainly be observed easily enough. The fact that they often are pursued even at great cost to the individual's safety is an earnest of the partial character of our previous discussion. In addition, the writer must admit that, though he has sufficient clinical evidence to postulate the desire to know as a very strong drive in intelligent people, no data are available for unintelligent people. It may then be largely a function of relatively high intelligence. Rather tentatively, then, and largely in the hope of stimulating discussion and research, we shall postulate a basic desire to know, to be aware of reality, to get the facts, to satisfy curiosity, or as Wertheimer phrases it, to see rather than to be blind.

This postulation, however, is not enough. Even after we know, we are impelled to know more and more minutely and microscopically on the one hand, and on the other, more and more extensively in the direction of a world philosophy, religion, etc. The facts that we acquire, if they are isolated or atomistic, inevitably get theorized about, and either analyzed or organized or both. This process has been phrased by some as the search for 'meaning.' We shall then postulate a desire to understand, to systematize, to organize, to analyze, to look for relations and meanings.

Once these desires are accepted for discussion, we see that they too form themselves into a small hierarchy in which the desire to know is prepotent over the desire to understand. All the characteristics of a hierarchy of prepotency that we have described above, seem to hold for this one as well.

We must guard ourselves against the too easy tendency to separate these desires from the basic needs we have discussed above, *i.e.*, to make a sharp dichotomy between 'cognitive' and 'conative' needs. The desire to know and to understand are themselves conative, *i.e.*, have a striving character, and are as much personality needs as the 'basic needs' we have already discussed (19).

III. FURTHER CHARACTERISTICS OF THE BASIC NEEDS

The degree of fixity of the hierarchy of basic needs.—We have spoken so far as if this hierarchy were a fixed order but actually it is not nearly as rigid as we may have implied. It is true that most of the people with whom we have worked have seemed to have these basic needs in about the order that has been indicated. However, there have been a number of exceptions.

(1) There are some people in whom, for instance, self-esteem seems to be more important than love. This most common reversal in the hierarchy is usually due to the development of the notion that the person who is most likely to be loved is a strong or powerful person, one who inspires respect or fear, and who is self confident or aggressive. Therefore such people who lack love and seek it, may try hard to put on a front of aggressive, confident behavior. But essentially they seek high self-esteem and its behavior expressions more as a means-to-an-end than for its own sake; they seek self-assertion for the sake of love rather than for self-esteem itself.

(2) There are other, apparently innately creative people in whom the drive to creativeness seems to be more important than any other counter-determinant. Their creativeness might appear not as self-actualization released by basic satisfaction, but in spite of lack of basic satisfaction.

(3) In certain people the level of aspiration may be permanently deadened or lowered. That is to say, the less potent goals may simply be lost, and may disappear forever, so that the person who has experienced life at a very low level, *i.e.*, chronic unemployment, may continue to be satisfied for the rest of his life if only he can get enough food.

(4) The so-called 'psychopathic personality' is another example of permanent loss of the love needs. These are people who, according to the best data available (9), have been starved for love in the earliest months of their lives and have simply lost forever the desire and the ability to give and to receive affection (as animals lose sucking or pecking reflexes that are not exercised soon enough after birth).

(5) Another cause of reversal of the hierarchy is that when a need has been satisfied for a long time, this need may be underevaluated. People who have never experienced chronic hunger are apt to underestimate its effects and to look upon food as a rather unimportant thing. If they are dominated by a higher need, this higher need will seem to be the most important of all. It then becomes possible, and indeed does actually happen, that they may, for the sake of this higher need, put themselves into the position of being deprived in a more basic need. We may expect that after a long-time deprivation of the more basic need there will be a tendency to reevaluate both needs so that the more prepotent need will actually become consciously prepotent for the individual who may have given it up very lightly. Thus, a man who has given up his job rather than lose his self-respect, and who then starves for six months or so, may be willing to take his job back even at the price of losing his self-respect.

(6) Another partial explanation of *apparent* reversals is seen in the fact that we have been talking about the hierarchy of prepotency in terms of consciously felt wants or desires rather than of behavior. Looking at behavior itself may give us the wrong impression. What we have claimed is that the person will *want* the more basic of two needs when deprived in both. There is no necessary implication here that he will act upon his desires. Let us say again that there are many determinants of behavior other than the needs and desires.

(7) Perhaps more important than all these exceptions are the ones that involve ideals, high social standards, high values and the like. With such values people become martyrs; they will give up everything for the sake of a particular ideal, or value. These people may be understood, at least in part, by reference to one basic concept (or hypothesis) which may be called 'increased frustration-tolerance through early gratification.' People who have been satisfied in their basic needs throughout their lives, particularly in their earlier years, seem to develop exceptional power to withstand present or future thwarting of these needs simply because they have strong,

healthy character structure as a result of basic satisfaction. They are the 'strong' people who can easily weather disagreement or opposition, who can swim against the stream of public opinion and who can stand up for the truth at great personal cost. It is just the ones who have loved and been well loved, and who have had many deep friendships who can hold out against hatred, rejection or persecution.

I say all this in spite of the fact that there is a certain amount of sheer habituation which is also involved in any full discussion of frustration tolerance. For instance, it is likely that those persons who have been accustomed to relative starvation for a long time, are partially enabled thereby to withstand food deprivation. What sort of balance must be made between these two tendencies, of habituation on the one hand, and of past satisfaction breeding present frustration tolerance on the other hand, remains to be worked out by further research. Meanwhile we may assume that they are both operative, side by side, since they do not contradict each other. In respect to this phenomenon of increased frustration tolerance, it seems probable that the most important gratifications come in the first two years of life. That is to say, people who have been made secure and strong in the earliest years, tend to remain secure and strong thereafter in the face of whatever threatens.

Degrees of relative satisfaction.—So far, our theoretical discussion may have given the impression that these five sets of needs are somehow in a step-wise, all-or-none relationships to each other. We have spoken in such terms as the following: "If one need is satisfied, then another emerges." This statement might give the false impression that a need must be satisfied 100 per cent before the next need emerges. In actual fact, most members of our society who are normal, are partially satisfied in all their basic needs and partially unsatisfied in all their basic needs at the same time. A more realistic description of the hierarchy would be in terms of decreasing percentages of satisfaction as we go up the hierarchy of prepotency. For instance, if I may assign arbitrary figures for the sake of illustration, it is as if the average citizen

is satisfied perhaps 85 per cent in his physiological needs, 70 per cent in his safety needs, 50 per cent in his love needs, 40 per cent in his self-esteem needs, and 10 per cent in his self-actualization needs.

As for the concept of emergence of a new need after satisfaction of the prepotent need, this emergence is not a sudden, saltatory phenomenon but rather a gradual emergence by slow degrees from nothingness. For instance, if prepotent need A is satisfied only 10 per cent then need B may not be visible at all. However, as this need A becomes satisfied 25 per cent, need B may emerge 5 per cent, as need A becomes satisfied 75 per cent need B may emerge 90 per cent, and so on.

Unconscious character of needs.—These needs are neither necessarily conscious nor unconscious. On the whole, however, in the average person, they are more often unconscious rather than conscious. It is not necessary at this point to overhaul the tremendous mass of evidence which indicates the crucial importance of unconscious motivation. It would by now be expected, on a priori grounds alone, that unconscious motivations would on the whole be rather more important than the conscious motivations. What we have called the basic needs are very often largely unconscious although they may, with suitable techniques, and with sophisticated people become conscious.

Cultural specificity and generality of needs.—This classification of basic needs makes some attempt to take account of the relative unity behind the superficial differences in specific desires from one culture to another. Certainly in any particular culture an individual's conscious motivational content will usually be extremely different from the conscious motivational content of an individual in another society. However, it is the common experience of anthropologists that people, even in different societies, are much more alike than we would think from our first contact with them, and that as we know them better we seem to find more and more of this commonness. We then recognize the most startling differences to be superficial rather than basic, *e.g.*, differences in style of hair-dress, clothes, tastes in food, etc. Our classification of basic

needs is in part an attempt to account for this unity behind the apparent diversity from culture to culture. No claim is made that it is ultimate or universal for all cultures. The claim is made only that it is relatively *more* ultimate, more universal, more basic, than the superficial conscious desires from culture to culture, and makes a somewhat closer approach to common-human characteristics. Basic needs are *more* common-human than superficial desires or behaviors.

Multiple motivations of behavior.—These needs must be understood *not* to be *exclusive* or single determiners of certain kinds of behavior. An example may be found in any behavior that seems to be physiologically motivated, such as eating, or sexual play or the like. The clinical psychologists have long since found that any behavior may be a channel through which flow various determinants. Or to say it in another way, most behavior is multi-motivated. Within the sphere of motivational determinants any behavior tends to be determined by several or *all* of the basic needs simultaneously rather than by only one of them. The latter would be more an exception than the former. Eating may be partially for the sake of filling the stomach, and partially for the sake of comfort and amelioration of other needs. One may make love not only for pure sexual release, but also to convince one's self of one's masculinity, or to make a conquest, to feel powerful, or to win more basic affection. As an illustration, I may point out that it would be possible (theoretically if not practically) to analyze a single act of an individual and see in it the expression of his physiological needs, his safety needs, his love needs, his esteem needs and self-actualization. This contrasts sharply with the more naive brand of trait psychology in which one trait or one motive accounts for a certain kind of act, *i.e.*, an aggressive act is traced solely to a trait of aggressiveness.

Multiple determinants of behavior.—Not all behavior is determined by the basic needs. We might even say that not all behavior is motivated. There are many determinants of behavior other than motives.⁹ For instance, one other im-

⁹I am aware that many psychologists and psychoanalysts use the term 'motivated' and 'determined' synonymously, *e.g.*, Freud. But I consider this an ob-

portant class of determinants is the so-called 'field' determinants. Theoretically, at least, behavior may be determined completely by the field, or even by specific isolated external stimuli, as in association of ideas, or certain conditioned reflexes. If in response to the stimulus word 'table,' I immediately perceive a memory image of a table, this response certainly has nothing to do with my basic needs.

Secondly, we may call attention again to the concept of 'degree of closeness to the basic needs' or 'degree of motivation.' Some behavior is highly motivated, other behavior is only weakly motivated. Some is not motivated at all (but all behavior is determined).

Another important point ¹⁰ is that there is a basic difference between expressive behavior and coping behavior (functional striving, purposive goal seeking). An expressive behavior does not try to do anything; it is simply a reflection of the personality. A stupid man behaves stupidly, not because he wants to, or tries to, or is motivated to, but simply because he is what he is. The same is true when I speak in a bass voice rather than tenor or soprano. The random movements of a healthy child, the smile on the face of a happy man even when he is alone, the springiness of the healthy man's walk, and the erectness of his carriage are other examples of expressive, non-functional behavior. Also the *style* in which a man carries out almost all his behavior, motivated as well as unmotivated, is often expressive.

We may then ask, is *all* behavior expressive or reflective of the character structure? The answer is 'No.' Rote, habitual, automatized, or conventional behavior may or may not be expressive. The same is true for most 'stimulus-bound' behaviors.

It is finally necessary to stress that expressiveness of behavior, and goal-directedness of behavior are not mutually exclusive categories. Average behavior is usually both.

Goals as centering principle in motivation theory.—It will be observed that the basic principle in our classification has fuscating usage. Sharp distinctions are necessary for clarity of thought, and precision in experimentation.

¹⁰ To be discussed fully in a subsequent publication.

been neither the instigation nor the motivated behavior but rather the functions, effects, purposes, or goals of the behavior. It has been proven sufficiently by various people that this is the most suitable point for centering in any motivation theory.¹¹

Animal- and human-centering.—This theory starts with the human being rather than any lower and presumably 'simpler' animal. Too many of the findings that have been made in animals have been proven to be true for animals but not for the human being. There is no reason whatsoever why we should start with animals in order to study human motivation. The logic or rather illogic behind this general fallacy of 'pseudo-simplicity' has been exposed often enough by philosophers and logicians as well as by scientists in each of the various fields. It is no more necessary to study animals before one can study man than it is to study mathematics before one can study geology or psychology or biology.

We may also reject the old, naive, behaviorism which assumed that it was somehow necessary, or at least more 'scientific' to judge human beings by animal standards. One consequence of this belief was that the whole notion of purpose and goal was excluded from motivational psychology simply because one could not ask a white rat about his purposes. Tolman (18) has long since proven in animal studies themselves that this exclusion was not necessary.

Motivation and the theory of psychopathogenesis.—The conscious motivational content of everyday life has, according to the foregoing, been conceived to be relatively important or unimportant accordingly as it is more or less closely related to the basic goals. A desire for an ice cream cone might actually be an indirect expression of a desire for love. If it is, then this desire for the ice cream cone becomes extremely important motivation. If however the ice cream is simply something to cool the mouth with, or a casual appetitive reaction, then the desire is relatively unimportant. Everyday conscious desires are to be regarded as symptoms, as

¹¹ The interested reader is referred to the very excellent discussion of this point in Murray's *Explorations in Personality* (15).

surface indicators of more basic needs. If we were to take these superficial desires at their face value we would find ourselves in a state of complete confusion which could never be resolved, since we would be dealing seriously with symptoms rather than with what lay behind the symptoms.

Thwarting of unimportant desires produces no psychopathological results; thwarting of a basically important need does produce such results. Any theory of psychopathogenesis must then be based on a sound theory of motivation. A conflict or a frustration is not necessarily pathogenic. It becomes so only when it threatens or thwarts the basic needs, or partial needs that are closely related to the basic needs (10).

The role of gratified needs.—It has been pointed out above several times that our needs usually emerge only when more prepotent needs have been gratified. Thus gratification has an important role in motivation theory. Apart from this, however, needs cease to play an active determining or organizing role as soon as they are gratified.

What this means is that, *e.g.*, a basically satisfied person no longer has the needs for esteem, love, safety, etc. The only sense in which he might be said to have them is in the almost metaphysical sense that a sated man has hunger, or a filled bottle has emptiness. If we are interested in what *actually* motivates us, and not in what has, will, or might motivate us, then a satisfied need is not a motivator. It must be considered for all practical purposes simply not to exist, to have disappeared. This point should be emphasized because it has been either overlooked or contradicted in every theory of motivation I know.¹² The perfectly healthy, normal, fortunate man has no sex needs or hunger needs, or needs for safety, or for love, or for prestige, or self-esteem, except in stray moments of quickly passing threat. If we were to say otherwise, we should also have to aver that every man had all the pathological reflexes, *e.g.*, Babinski, etc., because if his nervous system were damaged, these would appear.

It is such considerations as these that suggest the bold

¹² Note that acceptance of this theory necessitates basic revision of the Freudian theory.

postulation that a man who is thwarted in any of his basic needs may fairly be envisaged simply as a sick man. This is a fair parallel to our designation as 'sick' of the man who lacks vitamins or minerals. Who is to say that a lack of love is less important than a lack of vitamins? Since we know the pathogenic effects of love starvation, who is to say that we are invoking value-questions in an unscientific or illegitimate way, any more than the physician does who diagnoses and treats pellagra or scurvy? If I were permitted this usage, I should then say simply that a healthy man is primarily motivated by his needs to develop and actualize his fullest potentialities and capacities. If a man has any other basic needs in any active, chronic sense, then he is simply an unhealthy man. He is as surely sick as if he had suddenly developed a strong salt-hunger or calcium hunger.¹³

If this statement seems unusual or paradoxical the reader may be assured that this is only one among many such paradoxes that will appear as we revise our ways of looking at man's deeper motivations. When we ask what man wants of life, we deal with his very essence.

IV. SUMMARY

- (1) There are at least five sets of goals, which we may call basic needs. These are briefly physiological, safety, love, esteem, and self-actualization. In addition, we are motivated by the desire to achieve or maintain the various conditions upon which these basic satisfactions rest and by certain more intellectual desires.
- (2) These basic goals are related to each other, being arranged in a hierarchy of prepotency. This means that the most prepotent goal will monopolize consciousness and will tend of itself to organize the recruitment of the various capacities of the organism. The less prepotent needs are

¹³ If we were to use the word 'sick' in this way, we should then also have to face squarely the relations of man to his society. One clear implication of our definition would be that (1) since a man is to be called sick who is basically thwarted, and (2) since such basic thwarting is made possible ultimately only by forces outside the individual, then (3) sickness in the individual must come ultimately from a sickness in the society. The 'good' or healthy society would then be defined as one that permitted man's highest purposes to emerge by satisfying all his prepotent basic needs.

minimized, even forgotten or denied. But when a need is fairly well satisfied, the next prepotent ('higher') need emerges, in turn to dominate the conscious life and to serve as the center of organization of behavior, since gratified needs are not active motivators.

Thus man is a perpetually wanting animal. Ordinarily the satisfaction of these wants is not altogether mutually exclusive, but only tends to be. The average member of our society is most often partially satisfied and partially unsatisfied in all of his wants. The hierarchy principle is usually empirically observed in terms of increasing percentages of non-satisfaction as we go up the hierarchy. Reversals of the average order of the hierarchy are sometimes observed. Also it has been observed that an individual may permanently lose the higher wants in the hierarchy under special conditions. There are not only ordinarily multiple motivations for usual behavior, but in addition many determinants other than motives.

- (3) Any thwarting or possibility of thwarting of these basic human goals, or danger to the defenses which protect them, or to the conditions upon which they rest, is considered to be a psychological threat. With a few exceptions, all psychopathology may be partially traced to such threats. A basically thwarted man may actually be defined as a 'sick' man, if we wish.
- (4) It is such basic threats which bring about the general emergency reactions.
- (5) Certain other basic problems have not been dealt with because of limitations of space. Among these are (a) the problem of values in any definitive motivation theory, (b) the relation between appetites, desires, needs and what is 'good' for the organism, (c) the etiology of the basic needs and their possible derivation in early childhood, (d) redefinition of motivational concepts, *i.e.*, drive, desire, wish, need, goal, (e) implication of our theory for hedonistic theory, (f) the nature of the uncompleted act, of success and failure, and of aspiration-level, (g) the role of association, habit and conditioning, (h) relation to the

theory of inter-personal relations, (*i*) implications for psychotherapy, (*j*) implication for theory of society, (*k*) the theory of selfishness, (*l*) the relation between needs and cultural patterns, (*m*) the relation between this theory and Allport's theory of functional autonomy. These as well as certain other less important questions must be considered as motivation theory attempts to become definitive.

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EXPERIMENTAL EVIDENCE FOR FUNCTIONAL AUTONOMY OF MOTIVES

BY DOROTHY RETHLINGSHAFFER

Queens College

The emergent principle of functional autonomy of motives has been stressed by Allport (3). When activities exhibit this functional autonomy, "some new function emerges as an independently structured unit from preceding functions. The activity of these new units does not depend upon the continued activity of the units from which they developed" (3, p. 197). The strength, the long duration, the apparent independence from the original motives that may characterize the activities with this functional autonomy is indicated by his illustrations: "An ex-sailor has a craving for the sea," "a workman feels compelled to do clean-cut jobs even though his security . . . no longer depends upon high standards," "the miser continues to amass his useless horde," etc. (3, p. 196).

It is the purpose of this paper to evaluate the experimental evidence given by Allport (3, pp. 198-200), and certain related studies, in order to determine if the principle can be supported or if the systematic behavior of his illustrations might not be better interpreted by other factors.

Allport first suggests the circular reflex as an elementary instance of functional autonomy and later quarrels with it as support for adult behavior. Hence we will accept his own criticism (3, p. 202).

Next he cites the experiments which show that "incompleted tasks set up tensions that tend to keep the individual at work until they are resolved" (3, p. 198). Freeman (22, 23) found task tension increased after interruption as shown in tendon deformation, palmar skin resistance, and muscular action potentials, but Freeman's measurements of physiological changes were at the moment of interruption, or very

near, with no substitute activities intervening. His investigations, therefore, lend only inferential support to the existence of a tension sufficiently long to explain the resumptions of activities when an extended period has intervened between the interruption and the opportunity to return to the original activity. Freeman's explanation, it should be emphasized, is in terms of immediately competing patterns of neural excitation rather than in terms of psychic energy systems.

Abel (1) found that individuals with low Schneider index—indicating instability in neuro-circulatory activity—recall more completed tasks, while interrupted tasks are recalled more by those with high index. This result would suggest that the behavior at an interruption is determined in part by a somewhat consistent physiological condition, rather than by a condition created by the interruption.

Experimental evidence of *behavior* following interruption is given by the work of Zeigarnik (57), and substantiated by Pachauri (41), Marrow (35, 36), etc. But the Zeigarnik ratio rests upon the superior recall of only the names of interrupted tasks. Moreover these tasks are simple and brief. They frequently require only 3 to 5 minutes for completion, and are usually concerned with familiar material. The recall must also be within a short time after the interruption, or completion; otherwise the U-C ratio declines. This decline results from the fading of the interrupted activities, while the completed activities with no unresolved tension do not disintegrate (41). If tension from the interruption is to be considered as significant in understanding activities possessing autonomy, then the interrupted acts should stand up under the pressure of time. The Zeigarnik ratio is certainly not support for any long-continuing 'striving-from-within' operating in complex and difficult activities.

Ovsiankina's findings (40) that there is a greater resumption of interrupted activities than of non-interrupted acts has been confirmed by various studies (2, 22, 27, 30, 42), etc., although this resumption is significantly lowered when substitutes are introduced (27). However, the experimental records are obtained after brief interruption periods, usually on

the same day, or more frequently within the same hour. Moreover if the subjects do not resume their original activity within the first minutes, they are very unlikely to return to them. Ovsiankina noted that resumption would generally follow immediately or within 20 seconds. The writer found in 638 records of behavior following interruption with 58 subjects, that there were only 5 delayed resumptions after four minutes of delay. Eighty-four per cent of the delayed resumptions were within the first two minutes following the opportunity to resume.

It should also be remembered that resumption is lowered or destroyed whenever barriers are introduced between the original interrupted activities and the subjects. The writer found that resumption was cut approximately one-half by the use of quite simple objective barriers (42). It would appear that 'stimulation-from-without' is as essential as 'striving-from-within,' though the reverse of this was assumed by Allport in discussing functional autonomy of motives (3, p. 204).

No doubt the techniques of Ovsiankina and Zeigarnik illustrate the immediate effect of an interruption. But even if resumption (or greater recall) of interrupted acts can be attributed to mounting task tension during the interruption, there is still no evidence that such tension can be considered responsible for the continuance of long-lasting activities unreinforced by any motives. To do this such tension would have to continue through such interruptions as sleep, varying interrupting activities, periods of time measured in days, or weeks, or years, rather than minutes or hours.

The writer has recently emphasized the wide individual differences in the scores of tendency-to-continue as measured by the interruption technique (44). These scores were, in part at least, explained by a factor which was identified as the "general habit of keeping on at any task once started." To the extent that a person was strong in this habit, he would tend to keep returning to *any* activity and thus the appearance would be given of an act carrying itself. No experimental evidence has been obtained as to the length of time

such a general habit might operate, but it seems conceivable that some people might tend to carry on their activities over long periods of time when apparently the original motives were dead, being restimulated at intervals by such verbalised attitudes as "I always finish what I start."¹

Evidence other than the interruption experiments is also given by Allport in the field of conative perseveration, and many studies could be reviewed in the related topics of retro-active inhibition, reminiscence, reproduction of forms, etc. Some experimenters have interpreted their results as illustrating the dynamic nature of the process of forgetting; others are more in line with Woodworth's conclusion that the evidence is "against the assumption of any positive formative process in retention itself" (55, p. 91). Certainly the specific experiments cited (3, p. 198) could not be considered crucial. Kendig (31) found a five-minute interval most favorable for recurrence effects as compared to no interval or 30 minutes. Smith (48) found that the deconditioning process for a fear is more successful if begun immediately than if a delay of 24 hours intervenes though a 15-minute interval was not significantly inferior to 24 hours (C.R. of .83).

Next under the heading of Animal Behavior, Dodson's work (13) is cited by Allport as illustrating how rats will often perform a habit, learned under hunger, when they are fed to repletion. This study, along with other satiation experiments (4, 5), are subject to the criticism that unsatisfactory criterion of satiation were used.² Particularly in the field of animal behavior there are studies which emphasize the dependence of performance upon some original drive. When the animals were not rewarded, *i.e.*, being deprived of food on the maze (7, 52), or satiated with food after learning (51), they would not perform correctly in the learning situa-

¹ This behavior might be considered evidence for functional autonomy of motives, but such an interpretation does not consider the emergent properties that are present when the principle is operating. Allport accepts a "habit of doing any job well" as one of the *early* motives that might be present in the development of the maternal sentiment as a functionally autonomous motive (3, p. 197).

² Moreover the 'habit' began to disintegrate in 10 test trials, approaching chance behavior.

tion, although earlier and later tests indicated superior performance. When both the drive and the incentive were absent, rats did not persist longer than a few days in a learned sand-digging habit (50). When the drive remained constant, and incentives were changed in various ways (14, 25), we again find the maze performance altered. Mann (34) tested for the effect of a changed incentive when the rats were 'approaching mastery' of the problem. The results when the inappropriate reward was introduced before mastery were not significantly different from the results when introduced after mastery.

Allport writes of the 'dynamic character' of acquired rhythms of activity. In this regard Richter (45) found that rats will, even when starved, display the same periodic activity which their former feeding habits had forced on them. But the mere removal of the specific stimulus of feeding need not bring about an immediate cessation of activity, since it has been shown that such a physiological reaction as conditioned salivation to morphine may be evoked by the total situation (32). We also find that if the light-dark stimulation is reversed, the rhythm will follow the stimulation, but there is a lag in the reversal indicating an internal as well as an external control (29). Hemmingsen and Krarup (28) results would likewise indicate that these rhythms are not free from their internal control. They were unable to establish in rats a rhythm to fit a 16-hour day, 8 hours dark, 8 hours light. This result suggests that the 24-hour rhythm is inherent in the bodily processes themselves, and not imposed from without, nor learned. Such evidence would indicate that there may be a continuance of the internal control of rhythms even when the external stimulating situation is altered.

Since the above citations would indicate that experimental evidence for the emergent principle of functional autonomy of motives is at least limited, if not non-existent, the question remains as to what may the long-lasting systematic behavior of human adults be attributed? The factors which may be instrumental in giving the appearance of functional autonomy for such behavior will now be considered.

(1) *Motive supplied by conditioned expectancy.*—It is known that the expectancy of previously received reward or punishment may operate in the absence of the objective incentive. Miller (38) has shown that two new methods of escape from a recently charged grid could be *learned* under this 'anxiety' state. This acquired drive though persistent was finally extinguished unless trials with shock were given. Adults may operate on the expectancy of a distant reward, or on the anxiety of a possible punishment,³ and the reinforcement could be infrequent, yet sufficient to continue activities over so long a period of time that they might appear functionally autonomous.

(2) *Substitute motives in higher order conditioning.*—There may be present some general energizing agent in the building and maintenance of higher order conditioned responses, as is illustrated by the work of Finch and Culler (19), Brogden (8). It is possible that some of the activities of adults which appear free from the original drive were built up by the use of substitute motives in higher order conditioning.

(3) *Sub-goal reinforcement.*—Some long sequences of responses of humans may be given to conditioned sub-goals (tokens, symbols) whose occasional but necessary reinforcement by primary drives may not be so apparent as in the animal studies (20, 11, 54, 17, 47).

(4) *Rewarded practice of an activity.*—Activities that have been well practiced under a rewarded drive may continue, at least temporarily,⁴ when the drive is removed. To explain this continuation, Anderson has advanced the theory of externalization of drive, *i.e.*, late in learning the drive mechanism is externalized; the drive can be aroused even in the absence of the internal components by the external stimulus situation

³ Since the above was written, McClelland has developed the same suggestion in greater detail (37, p. 277).

⁴ Brogden refers to externalization of drive as an interpretation of the significant difference he found between the experimental extinction of satiated rewarded dogs and satiated non-rewarded dogs. Unfortunately the experiment was discontinued when the satiated rewarded animals were starting, apparently, to decline in their C.R.'s (9).

Wherry in an unpublished factor analysis of maze errors under the varying motivating conditions used by Anderson (5), emphasizes the decrease in efficiency of performance with even the externalized rewarded animals as the final phase of maze learning is reached, *i.e.*, when the actual learning factor is probably at work (53, 43).

(the food reward, the food box, etc.). This theory has been identified as a special case of an autonomous motive. However the experimental results which show such a continuance of performance are capable of other interpretations (46; 37, p. 278), as Anderson himself suggests. Also even with the primary drive removed, some slight motive may continue to operate so that generalized habits of attacking new problems, learned in the previous successful experience, could lead to quick error elimination.

(5) *Continued learning under drive when incentive is removed.*—After training 40 rats to press a bar in a Skinner box, Fitts (21) removed the food reward but *maintained the hunger drive*. He continued to obtain records of bar-pressing behavior over a seven months period that were superior to a control group not conditioned. Fitts writes: "habituation may serve as a quasi-motive and . . . 'operates as a determining factor of such weight as almost to seem a force in itself'" (21, p. 184). However, there is evidence within this experiment that the hungrier the animals were, the more they pressed the bar.⁵ It is possible that in the narrow environment of the animals, there was a continuation of learning under their hunger drive, a possibility which is strengthened by the work of Elliot and Treat (16).⁶

(6) *Generalized incentives and drives.*—Elliott found that rats continued to exhibit a maze habit with only slight disturbance, even though they started their learning on one drive (with its appropriate incentive) and then were switched to another drive (with its appropriate incentive). Bruce (10) used varying, instead of specific, incentives and drives and finally found no decrement in performance under the generalized motive. These experiments suggest methods of developing an activity free from the original need on which it started but not from all needs. The adult activities of hu-

⁵ Under two periods of food deprivation, not only did the animals exhibit different rates of responding upon the removal of the reward, but they continued to remain apart.

⁶ McClelland has excellently summarized various factors which will delay extinction when the reward is removed (37, pp. 280-281). The continuation of a learned act after removal of reward may also be attributed to these factors.

mans which seem so far removed from their original drives that they give the appearance of possessing functional autonomy may have developed under varying drives but have never been entirely free from some drive. There may be "functional autonomy from one need, but not from all needs" (6, p. 527).

(7) *'Useless' habits may be the expression of some need.*—Allport cites Gilhousen's experiment (24) as illustrating that "Among rats as among humans, old and useless habits have considerable power in their own right" (3, p. 199). However, behavior which may appear 'useless' may be 'psychologically useful.' Lewin has emphasized the difference between 'psychological' and 'geometrical' space. Snygg (49) has set up a situation in which some short paths were ignored in favor of a long path because of rat's preference for centrifugal swing. Yoshioka (56) found that a pattern difference *may* be a determining factor in a choice between paths. O'Kelly has suggested that in regressive behavior we have an attempt to relieve the tension caused by some preceding frustration (39).

In studies where some behavior may appear to have no value for the rat, we find the experimenter usually giving a reason for the animal indulging himself: strength of drive (15), over-learning (33), electric shock (26, 12), strong problem solving situation (24), emotional disturbance (18), etc. Fixation behavior is usually aroused in strongly motivated situations, and the supposed 'useless' habits may be attempts to relieve the tension present in such situations. Any survival of a supposed useless act after the opportunity for subsidence of the tension might also be traced to spontaneous recovery, lack of differential reinforcement between the efficient and the less efficient act (37, p. 279), or to remnants of the original situation. The last point is illustrated by Elliott (15) who found that rats fixated on one path under an intense hunger drive did not return to variable behavior at the 5-way point when the hunger drive was lessened, but, it should be noted, not entirely removed.

The present experimental evidence for functional autonomy of motives cannot be considered adequate. Certain

factors have been considered which may in part be responsible for the long-lasting adult activities that *appear* to be functionally autonomous. These factors, however, have by no means been completely developed. No studies in which they appear have been carried over any long period of time, and certainly they alone cannot be considered sufficient to account for the multiple systematic enduring activities of humans. However, they may be considered as possible substitutes for the principle of functional autonomy.

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SOME REMARKS ON THE PLACE OF THE INDIVIDUAL IN SOCIAL PSYCHOLOGY

BY HAROLD GRIER McCURDY

Meredith College

Mr. Bertocci's recent discussion of motivational theory in this journal¹ raises problems so fundamental that one wishes shrinkingly for some miracle of insight or faith to spare one the trouble of any further thought about them. This natural perturbation is scarcely lessened by the monitory reflection that the problems were already old in Plato's time and that being brought up against them today is a professional accident rather than a proof of dialectical competency. It is not without a sense of temerity, therefore, that I venture to add my comment upon these important topics of society, the individual, and psychological causation.

The central topic, it seems to me as it does to Mr. Bertocci, is the individual. No amount of declamation against the evils of atomism can free us from the necessity of describing any given area of experience in terms of entities whose minimum definition is that they are not the same as other entities within that area, nor the same as the area itself. When these entities are left unanalyzed and are employed as ultimates (and such ultimates are required in every description), they are individuals in the literal sense. They surrender their individuality the moment they are touched by analysis. But for every individual eliminated in this way, two or more others, like the heads of the fabulous dragon, spring up in its place. It makes no difference how refined the analysis becomes: It continues to yield individuals.

The individual yielded by analysis of human society is known to us both as a body in space and as an ego. The human body shares with others which we classify as living the

¹ P. A. Bertocci, A critique of Professor Cantril's theory of motivation, *PSYCHOL. REV.*, 1942, 49, 365-385.

characteristic of apparently uncaused movement. That is to say, it moves without its movement being observably preceded by the movement of anything else. Our surprise, moreover, at finding this singular property in bodies which we do not ordinarily classify as living indicates to us how intimately our whole concept of life is bound up with it; nor are we so far gone in our sophistication that we cannot readily sympathize with the Arabian who regards a whirling, erratically moving column of dust (what even we call a *dustdevil*) as a jinn, a living spirit. We are not so ready to attribute life to a static object. And it is especially that quintessence of life, the ego, which we reserve for those things which move deviously or by starts, mysteriously, unexpectedly.

The ego which each of us knows directly in himself is of no importance to social psychology, except that our beliefs regarding the egos of others are drawn from this self-knowledge, modified by a comparison of our bodies and bodily activities with theirs. We think that we discover in this way that the bodily movements of human beings are caused, that they carry out in an external world the wishes of an internal subject, and are thus theoretically predictable. But any actual prediction would have to be based on prior knowledge of the ego's intentions; and, barring cases of telepathy (which at the very best are sporadic), our knowledge of egos besides our own, insofar as it is particular, is purely *a posteriori*. Some observers, it is true, are keener than others at detecting and interpreting those slight bodily movements which are called expressions of emotion, and hence are more thoroughly forewarned when a really important bodily action ensues; but expressions of emotion do not by any means always lead up to some fullblown course of action, and even if they did we should still have to say that in them we know merely the effects and not the intentions of the ego, just as in the case of greater bodily movements.

We arrive at the position that the human individual as viewed by social psychology, namely as a body, is unpredictable in its motions because the ego which causes them is hidden. This is the most natural conclusion, since each of

us, not without lapses to be sure, experiences his own ego as a force controlling his body. It is not the only possible conclusion, however. It is possible to conclude that the human body is really controlled by external forces which are not easily observed, on the analogy of a puppet moved by invisible wires, and we could assemble some evidence for that view from the language of lovers, mystics, hypnotic subjects, and the insane, though here again we should have to admit that the controlling forces, because of their concealment, would be little better for predictive purposes than the ego. To this argument it will be necessary to return after considering briefly one historically important development of ego theory.

It has been the contention of some authors, notably McDougall, whose scheme of thought Mr. Bertocci is inclined to follow, that psychology gains in explanatory power by the postulation of instincts. The components of an instinct according to McDougall are three: an innate idea corresponding to a class of objects, a sensory and motor mechanism, and a fund of energy, all bound up together in such a way that discharge of the energy results in a fixed kind of action on certain objects. Every human being is born with a limited number of these instinctive systems, common to the whole species; and all the variety of human behavior, although enormously complicated by training, by shiftings of gears within the mechanism, and by hereditary differences in the relative potency of the several instincts, is ultimately reducible to them as causes. As to the instinctive energy, McDougall was not quite certain whether it should be regarded as different for each instinct, having an inherent direction of its own, or whether it should be regarded as common to them all, but in either case he allowed for a drainage of the energy from one system to another. If we pass over the unique and dubious idea of energies which are inherently directed and at the same time transformable into others, we find that the automaton described by McDougall separates neatly into two parts—a complex machine geared to a number, but a limited number, of mechanical operations, and a

spontaneous psychic energy which makes it work. The statistical kind of predictability to which it is subject depends upon the rigidity of the mechanical arrangements. It must work in one of a certain number of ways, if it works at all; but whether it *will* work at all, or when or how precisely, cannot be predicted, because that depends upon a spontaneous energy. In this latter we recognize our old friend the ego. But what about the former, the complex machine? At first glance it looks remarkably like a picture of the body, as analyzed into anatomical units such as bones, muscles, nerves, glands, and the rest; but I think this impression is deceptive. Indeed, it is a well-known criticism, with which I agree, that the instinctive patterns of action which McDougall localizes in the body and in the very germ-plasm itself are nothing more than abstractions from generalized descriptions of some of the more common forms of human behavior, and that in thus localizing and fixing them he is guilty of the same kind of error that there is in saying of a stationary stone, having perhaps seen one fall, that it is a thing-whose-nature-it-is-to-fall. If this is a sound criticism, then the instincts lose any claim to superiority over the bare ego as an explanatory principle and as a basis for rational prediction.

Returning now to the proposition that the human being is controlled by external forces, we find it easy to admit that, as a body, the human being cannot escape the conditions which we suppose to be sovereign over other bodies. The human body lies as much within a gravitational field as a stone and can just as well be set in motion by a push. Furthermore, the spontaneity of movement which it shares with other living bodies might reasonably be assumed to be an illusion due to a defect in our knowledge. This is what was so clearly proclaimed by Spinoza, who went still farther and maintained that the ego suffers the same kind of illusion in regard to itself when it appears to exercise freedom of choice. The apparently spontaneous movements of human beings may, after all, be no more spontaneous than the lurch of a piece of iron toward a magnet. Perhaps it is not purely metaphorical, for instance, to speak of personal magnetism,

and the fascination of some woman for some man, let us say, may be utterly compulsive. The counter-argument—that any given woman will have a limited appeal whereas the magnet never fails to produce an effect—is obviously faulty, since there are certainly many conditions under which the magnet will seem to fail also, while by the proper arrangements it might be possible to make the appeal of the woman seem invariably strong. But the real world to which our human social studies are confined does not conform to the simplistic laboratory requirements of an experiment in physics. Here, in the actual social world, there are movements in every direction of millions of bodies of all kinds, so that, even granting a kind of attraction analogous to gravitation, the behavior of a single individual caught in that complex intercrossing of lines of force would, in view of the limited sphere of experience open to any of us, necessarily surpass exact explanation. The position of psychology in respect to individual human behavior is, after all, no worse than that of physics in respect to the behavior of the individual electron. In that case, too, behavior is unpredictable and the individual is phenomenally spontaneous.

Whether, therefore, we conceive of the human body as moved by forces within or without, we reach the same conclusion: that individual behavior is unpredictable. This is true under the first point of view, even with McDougall's elaborations, because the very definition of the ego is spontaneity, and because, for social psychology, the ego is always hidden; and it is true under the second point of view, because the whole concourse of external forces acting upon the individual at any one moment of time is incalculable.

Both the notion of the ego as a free agent governing the body and the notion of fatal influences exerted upon it from the outside are drawn from our conscious experience, despite the obvious contradiction between them. We know what it is to do as we want, and we know just as well what it is to do as we do not want. At the same time we crave consistency (whence science), and powerful intellects have done us the service of displaying the consequences of accepting either no-

tion without compromise. Determinism by external forces, or a universal immanence, which comes to much the same, results in the view that the experience of free choice is an illusion. Determinism by individual volition, depending in the thought of Freud, for instance, on the thesis that the greatest share of our willing is unconscious, results in the view that the experience of being compelled is an illusion. On either view, the conscious ego is reduced to the merest ephemeral, the shadow of a shadow, rejoicing and suffering quite ignorantly and quite helplessly.

But helpless, ignorant, shadowy though it is, the conscious ego, that *dubio* or *cogito* which persistently asserts its existence, continues to trouble the philosophical conscience. Many ways have been found of degrading it, philosophically; no way has been found of getting rid of it. Behavioristic exorcisms and sociological purifications have not done the trick; they have merely rendered the subject improper and indecent. Mr. Bertocci is therefore heroic in developing at such length his theme that, "The causal matrix of a social movement is not in social norms but in the dynamic life of the individual who reacts to these norms with satisfaction and dissatisfaction, and who has the necessary understanding and ability to produce the same effects in others."² It is the smashing of a taboo.

And yet I continue to wonder what sort of scientific status the individual conscious ego can be expected to have. One or two of my own introspections, which I shall phrase, as I habitually do, as if they were everybody's, may have pertinence here. One knows when one wants; but one may want without knowing exactly what it is that is wanted. Also, one knows when one's wants are disappointed; and, strangely enough, this may happen when the thing which was apparently wanted has been attained. What consequences can be drawn from these facts? First, that our wants are not determined by the perception of a satisfying object. Second, that we may be deceived in the anticipation but not in the realization of an experience. Third, that our

² *Op. cit.*, p. 369.

wants do not determine the course of events so as to result in their satisfaction. It is true, in reference to the third point, that we can reconstruct nature according to our wants in dreams and hallucinations and artistic creations, but this is an expedient which most of us are quick to devalue as 'unreal.' This is not to say that our actions may not be directed toward desired objectives, and consciously so directed; but it is to say that the effective moving power does not lie with the will. And so, while it cannot be denied that wanting and seeking and the consciousness of seeking are immeasurably great facts, neither can it be asserted that they are the same as bringing something to pass. It is probably necessary to go as far back as Augustine to find a whole-hearted recognition of such a state of affairs, and it hardly needs to be added that *The City of God* is not an orthodox textbook in modern social science.

FACTOR ANALYSIS IN EXPERIMENTAL DESIGNS IN CLINICAL AND SOCIAL PSYCHOLOGY^{1, 2}

BY EDWARD S. BORDIN

University of Minnesota

I. INTRODUCTION

The fields of clinical and social psychology present similar types of difficulties to the experimental psychologist. Both of them encompass many complexly organized variables, difficult to delineate and still more difficult to abstract for purposes of experimental control. Indeed, one of the ever recurring criticisms of experimental efforts in these fields is that the processes of abstraction and control have done violence to the original data. On the other hand, critics largely have been unable to offer substitute experimental methods, capable of providing data to test a hypothesis to the satisfaction of any one other than the experimenter or others of his theoretical predilections.

I shall attempt to present an extension of the method of factor analysis which, it is believed, offers an analytical structure for the design of experiments which will avoid distortion of the raw phenomena and yet permit rigorous and systematic tests of hypothesis. Since any development in methodology must stem from some theoretical orientation, either implicitly or explicitly accepted, it is desirable to describe the assumptions upon which this experimental conception is based. If the following discussions seem to give more attention to theories in social psychology, it is because the views taken are less widely accepted in this area. In addition the experiment which will be described to illustrate the suggested

¹ This is an expansion of a paper entitled "Factor Analysis—Art or Science?" presented at the annual meetings of the American Psychological Association at Evanston, Illinois, 1941.

² The writer wishes to acknowledge his indebtedness to Dr. H. A. Edgerton under whose direction was worked out the thesis presented to the Graduate School, Ohio State University, in partial fulfillment of the requirements for the Ph.D. in which were developed the ideas presented in this paper.

methodology was directed toward a social psychological problem.

II. THEORETICAL FOUNDATIONS

Not all of the lack of progress in experimentation in the fields of clinical and social psychology may be laid to the complexity of the data. Certainly, some importance must be attached to the confusion as to the nature of the original data which define these two fields. This confusion is particularly noticeable with respect to social psychology. In recent years Cantril (5), Smoke (11), and Kantor (7), have surveyed the field of social psychology and remarked upon the diversity of views expressed and behaviors included under this rubric. While the nature of the field of clinical psychology has forced a consideration of the individual and his history, social psychology has not been so fortunate.

In his analysis of the field, Kantor (7) has pointed out the tendencies toward confusion between the data of social psychology and sociology. He has analyzed three sociologically rooted views of the data of social psychology: 'the behavior in groups' view, 'the reactions to persons' view, and the 'socialization' view. He suggests that the first and last of these views, in confining their analysis to the level of the group, neglect the important factor of the individual's behavioral history and the manifest heterogeneity of behavior in sociologically defined groups. The second view appears to have little to recommend it beyond convenience for classifying certain studies. Otherwise, there seems little support for assuming that social psychological behavior occurs only in response to persons as stimulus objects. Certainly, the representation of an elephant with the letters GOP on it may have stimulus functions which are distinctly social psychological.

To set the orientation of this discussion it should be stated that in the writer's opinion, Kantor's conception of the field of social psychology is the most acceptable one so far advanced. He has presented the view that the data of social psychology may best be distinguished as the shared reaction systems of persons. The inevitable living together of human

beings influences the way in which they interbehave with stimulus objects. Three types of behavior are distinguished: universal, idiosyncratic and cultural. Universal behavior refers to activities in which the response-stimulus functions are universally distributed, primarily because they operate on a natural basis. A pain reflex is an example. In idiosyncratic behavior the particular stimulus function attributed to the object by the individual is independent of both the object's natural properties and the way in which other individuals respond to it. In the creative artist, the original scientist or the prolific inventor one finds a large number of such unique forms of action. As was indicated, cultural behavior refers to the shared reaction systems of persons. For the most part, persons perform responses according to ways instituted by the social psychological groups of which they are members. In other words stimulus objects become endowed or invested with certain stimulus functions—*e.g.*, those correlated with specific language patterns or with making use of them in certain ways. On the response function side there are specific adjustmental modes common to a particular set of people—modes of pronunciation, manipulation, believing, feeling, etc. These forms of interbehavior are called cultural. They develop when the individual has ways of interbehaving thrust upon him by a social psychological group in place of being given the opportunity to develop his own types of action as is true in idiosyncratic behavior.

Notice that in these concepts there is no concern with collective behavior as sociological phenomena, *i.e.*, group behavior *qua* group behavior, but with conformity stimulus and response functions. A group for a psychologist is not a set of persons arranged in sociological classes, but a set of persons who are characterized by common stimulus and response functions. The social psychologist deals with the common shared responses to institutional stimuli. A social psychological group could consist of two individuals as in the case of two children who develop their own language. Group participation means the sharing of a single reaction system or trait.

These theoretical concepts lead logically toward a concern with the individual's behavioral history. This means that analysis must penetrate beyond the level of the group and that historical factors are given full consideration. These are principles which have been given full acceptance in the fields of clinical psychology, but appear to have a precarious foothold in the field of social psychology. In recent years much support to the emphasis on the study of the individual and his history has been given by G. W. Allport's (1) stimulating treatment. Murray, who has also contributed greatly to this view, makes the point very well when he says, "Furthermore, since these students of personality are apt to ignore the past history of their subjects, their final formulations are generally too static. To fully understand a trait one must know its genesis and history" (10, p. 33).

To follow these statements further, it is not only necessary to go beyond the level of the group in the analysis of social psychological and clinical data, but to go beyond the level of observation of a particular point in time. One of the typical analytical operations is to correlate one behavioral observation to another. This operation is usually conceived as revealing the organization of behavior or of mental life. But to stop at this level of analysis does not seem to be very fruitful unless special assumptions are made as to the antecedents of this organization. All too frequently there appears to have been either an implicit or explicit assumption that this organization reflect specific biological entities. With such an assumption, the psychologist, in order to complete his experiment, must become a biologist or leave the real fruit of his research to another discipline. The latter has been the case. Perhaps even of less value has been the tendency, so clearly analyzed by Kantor, (7, 8) for psychologists to treat biological assumptions as facts or to pyramid their biological assumptions to a precarious degree.

In its simplest form biological postulation will go through the following type of process: Two items of behavior, usually test behavior, are being studied for their relations. If they are found to be related, the next step is to assume that some

internal biological principle accounts for the observed relationship. But the simplest interpretation of this process is that it is a semantic analysis, *i.e.*, it investigates the question whether certain behaviors which seem (are verbalized as) different ones are functionally the same. As an example, suppose we have two sets of items of behavior, one of which we have labeled vocabulary behavior and the other reasoning behavior. If we find that the individual's performance on these two sets of items is equivalent, the conclusion which makes the least assumptions is that we have made a mistake in using different labels for these behaviors. At least this interpretation seems to involve less unknowns than one which assumes that some biological entity underlies these two sets of behaviors. This latter explanation includes the former, but the former does not need to include the latter. Thus, to state more fully the position taken, we look toward the individual's reactional biography as the major source of understanding of his present behavior and guard against the inviting bypaths of biological postulation or recourse to other internal types of explanation.

III. FACTOR ANALYSIS AND THE CORRELATION OF PERSONS

We turn now to the problem of the design of experiments in the field of social psychology. There appear to be two divergent views in this respect, one we may call the statistical and the other the historical and clinical view. The statistical approach is usually linked with an emphasis on the reproducibility of the result and the empirical nature of the tests of significance. The historical and clinical approaches are usually linked in that they are concerned with a longitudinal analysis of the individual. Characteristically, advocates of these latter approaches display a distrust of the statistical method which seems to stem from two sources. First, it is claimed that the statistical research worker is prone to estimate the relevance of a variable on the basis of its amenability to quantitative treatment. Second, his statistical treatments may be more distinguished by their complexity and erudite-

ness than by statistical hypotheses which are appropriate to furthering our psychological insight.

On analysis it appears that neither side of this issue can escape unscathed. But the real need is that the investigator free himself of this controversy and approach each problem with certain criteria of the adequacy of any experiment. These may be stated as: (1) the experiment must be reproducible, (2) the design of the experiment must be based upon a consideration of all the relevant factors, (3) the hypotheses being tested must be stated in such a manner that they are capable of disproof by the experiment.

With this setting one approaches the consideration of factor analysis as a tool of statistical research. This method has received its widest application in the field of test construction. Most of the factor analysts have stated their problem as that of achieving the most parsimonious description of an inter-correlation matrix. Pushed for a justification of this objective, they have invariably replied that this process is a means by which test construction may make new forward strides. The process of factor analysis will be productive of new insights into the primary structure of the total set of activities being measured, and of the result to be expected in tests from which are removed the overlap in abilities required—in other words pure tests (9, Chap. I; 12, Chap. I).

These objectives and their implications have been analyzed to show their dependence upon neurological and genetic assumptions. For example, Anastasi (2) has held that Thurstone's concepts of simple structure and of positive manifold depend upon an outmoded concept of the structure and function of the human cortex. Perhaps a more penetrating and dispassionate analysis of this dependence upon physiological and biological hypotheses has come from Burt, himself one of the leaders in the development of the method. In a chapter entitled 'The Metaphysical Status of Human Factors' (3, Chap. VII) Burt points out that most of the workers have constructed deductive systems based on a simple (?) set of postulates and himself affirms his faith that factors will prove to be 'powers' or 'abilities' or 'mental energies' (3,

p. 236). One may question the simplicity of a set of postulates which should take years of exacting physiological research to prove and for which there is no particular basis for an assurance of proof.

A number of writers have pointed out that mathematically there are infinite ways of describing an intercorrelation matrix in terms of independent variables. Holzinger gives us a succinct statement:

Factor analysis is a type of statistical theory in which a variety of solutions can be obtained for a given set of data. . . . The arguments for preference have sometimes been upon agreement of a certain psychological theory with a proposed method of factorial method. Preference for a given method has been argued because factors so determined have 'psychological meaning' whereas by other methods they do not. It has even been claimed that a certain method yields 'invariant' factors in some sense, while other systems of factors lack this property. Other arguments for choice appear to be based upon purely statistical considerations leading to mathematically elegant solutions (6, p. 235).

Since there is no mathematically unique basis for choosing one solution from the many, some other basis must be sought. Invariably, we find that the research worker has chosen the solution which is consistent with his presuppositions. This creates a situation which is dangerously similar to a dog chasing his tail. The research worker is operating within a circle which is created by the dependence of his findings upon his hypothesis. Thus a study of this sort cannot be truly said to produce scientific facts, but merely to demonstrate that the data can be manipulated to fit a preconception.

Indeed, some of these workers have recognized this limitation in their work and have pointed out that they do not claim to be establishing scientific facts, but hypotheses which can then be tested in the fields of physiology, neurology, or genetics. But it would seem that these hypotheses were present at the beginning of the research. Since we agree that they are not crucially tested by it, there seems little purpose to this type of research.

Most of the factor analysis studies have been based upon the intercorrelation of tests or test items. As we have pointed

out, this is in keeping with the biological type postulation. The emphasis is placed upon a population of behaviors. The primary concern is with their interrelations. It is assumed that these interrelations will reflect explanatory entities.

In England, Burt, Stephenson, and their co-workers have tried a new basis for the computation of correlations. As described by Burt (3, Chap. VI), this method, correlating persons instead of tests, seems to have originated in connection with the analysis of ratings, and to have been used almost exclusively with this type of data. Factor analyses have been made of these data in many cases. Burt and Stephenson, the chief exponents of this method, do not agree as to its significance. Burt considers it a mere convenience and assumes that the factors revealed by the inverse method will be identical with those by the traditional method. On the other hand, Stephenson, taking a typological approach, assumes that a new type of factor is revealed. However, one is unable to gain a clear idea of what these new types of factors consist.

Let us examine this method. In this type of experiment the persons become the variables and the test items or any quantitatively expressed series of behavior items become the population. The correlations computed in this manner express the correspondence of the variation in one person's behavior to the variation of another's behavior in terms of the same items. Another way of expressing it is to say that the traditional method of correlation is concerned with intra-individual variation, while this method is concerned with inter-individual variations in behavior.

The factor analysis of an intercorrelation matrix of persons locates these persons in factor space. The same limitations are found here—there is no mathematically unique factor solution. However, where in the old method one is powerless, within the confines of the experiment, to break this circle, in this new one the analysis can be extended in such a way as to provide an empirical test of the meaning of the factor axes.

Let us consider the way in which the research worker identifies his factors in the traditional experiment. The method consists of comparing the tests which have high load-

ings with those which have low loadings for the factor to be identified. The research worker then judges what it is that appears to distinguish these two groups of tests. This procedure of course, offers the experimenter excellent opportunities for the free play of his presuppositions.

On the other hand, in the experiment involving the inverted technique, the same process may fulfill the requirements of a scientific procedure. Since one is now dealing with persons who have high and low factor loadings, the facts can be obtained in a public manner. Persons have many characteristics which are observable by all and on which all can agree. For example, they are male or female, they have been good or poor achievers, have lived in high level or low level economic environments, etc. These characteristics may then be related to the factor loadings by appropriate statistical procedures for indicating relationships and thus result in an identification or non-identification of factors. In essence, it represents a means whereby the best parts of the clinical and statistical methods may be combined.

The effects of the worker's assumptions upon his methods of analyzing his data may be seen in the fact that to the writer's knowledge none of the previous users of inverted factor analysis has systematically applied such an extension of the method. Burt briefly mentions a correlation between a personality test and a factor obtained in one of his studies (3, p. 394) and carries it no further. It would seem that these men are so preoccupied with biological hypotheses that they have overlooked other approaches to the data.

IV. EXPERIMENTAL APPLICATIONS

A discussion of the experimental applications of the analytical methods which have been outlined in the preceding section is necessary for complete conceptualization of the process. In this section will be described the design of an experiment which was carried out to illustrate the method and which has been more fully reported elsewhere (4). In addition the possible applications of the method to other ex-

perimental problems in the fields of clinical and social psychology will be discussed.

The actual application of the method was attempted as part of an experimental approach to the problems of the social recreational behavior of college students. A group of 41 students who enrolled in the College of Education at Ohio State University were selected as the subjects. These students reported their degree of participation in 119 different types of social recreation activities at two different times, once during their first two weeks of entrance to the university and again approximately a year and a half later.

The process of analysis of these data involved the treatment of the array of participation values for each individual as a variable. Thus two sets of 41 person-variables involving a population of 119 observations were available, one set representing the group at entrance to college and the other the group a year and a half later. By intercorrelation of the variables in each set, two 41 variable intercorrelation matrices are provided. The next step was the factor analysis of each of these matrices. Presumably, the factor analysis of the first matrix should isolate the main variables or factors which influenced or were related to the observed communalities of behavior between the individuals in the group at the time of entrance to college. Since in the first two weeks the college environment would have had little opportunity to operate, the observations at this point may be taken to reflect more of the pre-college environment than the college one. The factor analysis of the second matrix should bring more fully into focus the possible influences of the college environment.

In order to investigate whether the factor-abstractions have any meaning beyond their significance as mathematical operations, the individuals in the group were studied with the view of finding data which would show a regular relationship to the factor values. The personnel files of the college were the primary source of this information. These files contained records of tests relating to the students' academic abilities, personality and interests. There were also general information blanks of the sort typical of college entrance forms, con-

taining questions about the student's family, record of activities, work history, vocational aspirations, etc. There were also records of the students' actual achievement in college, their present majors, and records of interviews with advisors and college administrators.

It is at this point that this particular experiment fails to meet the full qualifications for adequacy. The types of information which were available for this study must be considered the bare minimum for a real clinical case study of these students. In addition, the nature of the sources of information, the biggest ones being the college application blank and records of Freshman Week interviews, placed the greatest emphasis on the individual's status at the time of entrance. The information on what transpired in the interim before the second set of observations was woefully meager.

Yet the shortcomings of this experiment merely serve to emphasize the latent power in this experimental design. The fact that such a crudely executed study could produce positive results seems to promise much more return with opportunities for more careful experiments. In this study it was possible to show that one of the factors in the first matrix correlated significantly negatively with the students' academic abilities and achievements. Another factor was found to be the students' general sociability³ as defined by an A not-A type of judgment arrived at by a reading of all of the materials. A check on the reality of the latter result was provided by an independent set of judgments by another clinical worker.

The analysis of the second matrix in relation to what relevant historical materials were available gave support to the possible hypothesis that a new set of variables would be operating at the time of the second set of observations or at least a new set of relations would exist. Neither the sociability judgment nor the negative relation with academic abil-

³ This is a familiar trait. The trait name usually is used to characterize a person well at ease in a variety of social situations, a person who has confidence in his social skills, a person who assumes that others look on him with favorable eyes.

ity and achievement were found to figure in this second set of behavioral observations. A new set of variables appeared in the form of a relation of one set of factor loadings to possession of a musical skill and/or participation in musical activities. Another set of factor loadings were found to be related to a combination of high academic ability and achievement and musical skill and participation.

One may conclude that the experiment which has been described does illustrate the value of the experimental method. The introduction of more complete clinical analysis, *i.e.*, the more complete collection of historical data, interviews with the students at the two stages of their development and interviews with others who had contacts with them, undoubtedly would have given considerable depth to our understanding of the behavioral phenomena in question. Thus we see that this experimental design permits an effective comingling of the statistical and clinical methods in such a manner as to permit of more systematic and public demonstrations of the tenability of various hypotheses and yet retains that proximity to the raw data of psychology which clinical psychologists have so rightfully emphasized. Further, this type of experiment, by its very proximity to the raw data, can stimulate the development of further insightful hypotheses about the behavioral phenomena under observation.

An experimental method based on a systematic concept of the field of psychology should be capable of suggesting actual experimental problems—either new problems or more effective ways of studying old problems. One of the problems that psychologists have been attacking with renewed vigor is the question of personality development and organization. Of the recent studies, the cooperative research carried out by Murray and his co-workers at Harvard (10) have been of special significance. With an interest in the genesis and development of behavioral traits, this group has emphasized the need for clinical and historical observation.

The method followed has been such that each experimenter has contributed to a pool of knowledge about the

subjects who were paid to cooperate over a long period of time. While the results of these studies were suggestive, the full value of such an approach could not be realized because analysis of much of the significant data was such that only the experimenters could feel that they had gained anything which could be relied upon. This is often the result of an experiment which relies upon the clinical method.

It is the writer's belief that the design of experiment which has been suggested in this paper would be applicable to the type of situation in Murray's research. This type of experiment would provide a systematic method for relating the individual's present behavior pattern to his biography. It would be a means whereby clinical judgments could be related to observations of current behavior in such a manner that other workers could follow the process by which the conclusions are reached. Given the clinical judgments and the observations of current behavior, any worker could carry through the analysis and arrive at the same conclusion. The difficulty with most clinical studies has been the private manner in which the conclusions are reached. In other words, given the same data other workers would arrive at different conclusions.

One obvious area for the application of this method of research is in the nature-nurture problem. The major source of data on this question has been the comparison of the correlations of siblings, dizygotic and monozygotic twins. It should be noted that these correlations are based upon the pairing of sets of observations of each sibling or twin pair. A method which would hit more directly at the problem would involve the collection of a series of observations of each individual on the behavior trait being studied. We would then correlate the individuals and carry out a factor analysis of the matrix. A study of the groupings of the individuals which would be revealed by this analysis should indicate what variables may be presumed to be operating.

It is important to note that this experiment does not require a population of twins or even siblings. The important criterion for the selection of the individuals is that they sample

the variables assumed by the experimenter to be important operators in the experimental behavior. Thus we might chose individuals to sample various levels of presumed heredity or we might select a group of individuals from the same level and vary other types of participating variables. It is clear that the important aspect of this study would be the completeness of the biographical data.

Still another question which seems amenable to this type of experiment is that of the development of attitudes and the conditions fostering their changes. Newcomb has described an ingenious study of the social attitude changes of a group of students in a girls' college under certain controlled conditions.⁴ This study illustrated the effects of certain conditions upon the attitude changes in the subjects. However, the nature of the method was such that only group results were obtained. The group was a sociologically defined rather than a psychologically defined unit. As such the results must be limited as regards their psychological implications.

This type of experiment could be repeated in such a manner as to provide more psychologically meaningful evidence. To do this we must concern ourselves not only with control of the psychological conditions surrounding the experimental behavior but must include the consideration of the biographies of the subjects. With a population of observations of the individuals' attitude changes under different conditions we could then intercorrelate these changes and follow through with a factor analysis. The final step would bring us to a comparison of the subjects, grouped according to the nature of their attitude changes, in terms of the biographical data. There seems to be little tendency toward disagreement with a thesis that individuals' social attitudes are intimately linked with their biographies. The experiment which has been outlined would provide an excellent opportunity to study the principles which are operating in this area of human psychology.

Thus it has been shown how our experimental methodology may be applied to a number of problems with which psy-

⁴ Described during a round table discussion at the annual meetings of the American Psychological Association held at Evanston, Illinois, 1941.

chologists have been concerned. From the types of experiments that have been outlined and the types of variables which have been under consideration, it is evident that experimental methodology cannot be divorced from the theoretical assumptions from which it stems. That experimental method does grow out of the implicit or explicit assumptions of the experimenter is a truism which seems to require continual restatement. One may speculate that it was the failure to see these relations that has led workers to use the method of inverse factor analysis without realizing the possible extensions which have been suggested in this paper.

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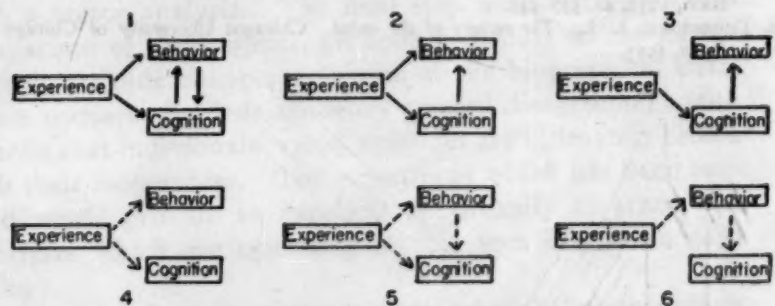
IS HABIT FORMATION ALWAYS MEDIATED BY COGNITION-FORMATION?

BY J. M. STEPHENS

Department of Education
The Johns Hopkins University

Presumably there can be no disagreement over the fact that habit formation and the acquisition of cognitions often go hand in hand. To admit this is merely to admit that the man who has established the *habit* of arising at 7.10 to catch the 8.25 train may also *know* that failing to rise about this time may result in being late for work.

In view of this relation between cognitions and behavior it may seem natural to suggest, as Tolman does, that the experience produces the new cognitions and these in turn bring about the corresponding behavior. While it seems impossible to deny that this sequence may often function, it is not necessary to hold that it is the only sequence which may function, or to hold that all correspondence between behavior and cognition can be explained in this way. The sequence stressed by Tolman is in fact only one of many possible sequences, each theoretically adequate to explain the relation between cognitions and behavior. The more simple of these have been sketched in the figure.



THE MORE SIMPLE CAUSAL SEQUENCES ADEQUATE TO EXPLAIN THE
EXPERIENCE-ENGENDERED CORRESPONDENCE BETWEEN
COGNITIONS AND BEHAVIOR.

In general we can say that the relation would be explained (1) if the experience which brought about the new behavior also brought about the new cognitions independently or (2) if the experience produced one of these correlates and this in turn produced the other correlate, or (3) if any combination of (1) and (2) existed.

It would not be surprising if at different times or under different circumstances any one of these sequences may operate. Under some circumstances the new cognition may be the basis for the new behavior. Under other conditions the new behavior may give rise to corresponding cognitions, while in still other circumstances the experience may directly produce both behavior and cognitions.

It may be, however, that such a catholic or eclectic view is distasteful to many theorists. Many theorists may not be satisfied with a hotch-potch of mechanisms each of which works only part of the time. And indeed almost anyone would feel better if it could be shown that one of these mechanisms was the sole cause of the correspondence between experience and cognitions.

When we begin the search for a mechanism which is singly and exclusively true, our standards of plausibility become much more rigid. While any one of the mechanisms sketched in the figure could be regarded as making some contribution to the correspondence between cognition and behavior, few of them can be considered seriously as candidates for exclusive validity.

Mechanisms 4, 5 and 6, sketched with broken arrows in the figure, appear especially unpromising candidates for exclusive truth. Any of these three mechanisms, if exclusively true, would imply that cognitions could never, under any circumstances, influence behavior directly.

Of the three remaining mechanisms I have chosen to examine the claims to exclusive validity of the third or the Tolman hypothesis. This choice is due partly to the fact that this is the most restricted and rigid of the three hypotheses and partly to the fact that it is perhaps the most widely known of any of the three hypotheses. If this well

known, plausible and relatively simple mechanism could be shown to be exclusively true, many matters would be greatly simplified.

In order to test the exclusive validity of the Tolman hypothesis, it is merely necessary to see if variations in experience are accompanied by variations in behavior when variations in cognitions are eliminated. If such concomitant variation were found it would show that the Tolman hypothesis, however true it may be as a part-time law, is not sufficient to account for all the correspondence between cognition and behavior.

Even before the Tolman view had gained its present prominence, there were some data (1) available to show that the relation between cognitions and new behavior is not a neat one-to-one affair. These data showed that with a constant cognition, ("I was wrong that time") the likelihood of new behavior varied. When the cognition had been brought about by one type of experience, the new behavior was more likely to be in line with that cognition than when the cognition had been brought about by another type of experience.

The experiment just cited merely showed, however, that when cognitions are held constant, behavior may still vary. It does not show that these residual variations in behavior have any systematic relation to the experience. It is still necessary then to see if *systematic* variations in experience are accompanied by *systematic* variations in behavior when cognitions are held constant.

General Procedure.—Since the details of the experiment may be obtained from other papers (2, 3), only the general procedure is given here. On one day (Information Day) 119 high school boys were given a multiple-choice test of from 60 to 100 questions. For each question there were three choices. The student indicated his choice (and degree of certainty) by applying a moistener to the appropriate parentheses. This application brought out a symbol printed in invisible ink and told the student (in most cases) whether he was right or wrong. In some cases he received no information regarding the correctness of his choice.

On the next day (Test Day) the subject took the same test and again indicated his choice to each of the questions. Immediately after all the questions had been answered these same questions were again presented and the subjects were asked to indicate (a) which choice they had made on the *previous* day and (b) what information (effect) they had received.

Treatment of the Data.—From the first presentation on the test day we can determine whether or not the *behavior* has changed as a result of the experience of learning the correctness of the choice. We can find out, for instance, if a subject is likely to avoid a choice which has proved to be wrong or to retain a choice which has proved to be right. From the second presentation on the test day we can determine the *cognitions* induced by the experience of finding the correctness of each choice.

It happened that in some instances the cognitions were wrong. A subject may not have remembered either the choice he made on Information Day, or the information he secured. Or he may have correctly remembered the choice but not the information, or vice-versa.

Because of this occasional lack of correspondence it was possible to secure groups of choices which were identical with respect to the cognition but which varied with respect to the actual experience. For instance, we may have a group of questions all of which are *remembered* as "Choice X selected and turned out to be right." Among these questions so remembered, however, there may be some in which Choice X was selected but actually turned out to be wrong, or turned out to yield no information.

Theoretically we should be able to construct a similar table from those questions in which the choice itself is incorrectly cognized. In practice, however, this procedure is somewhat treacherous. It may happen that when both choice and effect are incorrectly remembered, the two errors will compensate for each other and the net result will be the same as when both choice and effect are correctly remembered. A person who chose (a) and found it to be right but thinks

that he chose (b) and found it to be wrong, would, through cognitions, be led to choose either (a) or (c) on his next encounter with the question. If, however, he had correctly remembered his experience he would also choose (a). Hence the double error in cognitions has an even chance of leading to the very choice which should follow from a correct memory.

Rather than try to arrange for adequate safeguards against this possibility we shall confine our attention to those questions in which the choice was correctly remembered but in which the effect was variously cognized.

The choices in the table have been arranged so that for any given row the cognition is constant. The cognition for

TABLE
VARIATIONS IN THE PER CENT OF PERSISTING CHOICES ACCOMPANYING
VARIATIONS IN THE ACTUAL EFFECT WHEN THE COGNIZED
EFFECT IS CONSTANT (THE CHOICE BEING
CORRECTLY COGNIZED).

Cognized Effect	Total Number of Choices			Number Persisting			Per Cent Persisting		
	Actual Effect			Actual Effect			Actual Effect		
	Wrong	None	Right	Wrong	None	Right	Wrong	None	Right
Strong Choices									
Right	73	143	402	65	130	387	89 s	91	96 s
No Effect	151	386	152	103	321	134	68 s	83	88 s
Wrong	351	151	41	54	66	22	15 s	44 s	54
Effect not Remembered	123	241	131	97	188	101	79 i	78	77 i
Weak Choices									
Right	41	69	196	31	58	180	76	84 i	92 i
No Effect	73	175	52	44	128	34	60 i	73	66 i
Wrong	169	76	30	21	30	17	12 s	39 s	57
Effect not Remembered	91	164	62	56	103	44	62 i	63	71 i

The symbol (s) following two per cents in a given row indicates that the difference between those two percents is significant at the 1 per cent level. The other symbol (i) indicates that such differences were not significant. Wherever possible the difference between right and wrong was used. When the total number of choices for one of these effects fell below 50, however, the other effect was compared with the "no effect" condition.

the first row is "X was chosen and led to 'Right.'" While the cognition is constant for each row the actual experience varies. Some of the choices led to "Wrong," some led to no effect while the majority, of course, did lead to "Right."

It will be seen that the choices are classified as "Strong" and "Weak." The distinction between "Strong" and "Weak" choices is discussed at length in previous papers (2, 3). The classification was based on the student's estimate of certainty of his choice and on the consistency of choice prior to receiving the information. Actually there were five degrees or categories of strength available. The adjacent categories were combined until there were at least 50 choices in at least two of the first three cells in each row of the table. On the basis of this criterion two strength groups emerged.

In the first three rows of the table we find that when the cognition is held constant, the persistence of the choice (behavior) varies directly with the actual experience. Choices, all cognized as leading to "Right" are more likely to persist if they actually have led to "Right" than if they actually led to "Wrong." This holds true for choices cognized as leading to no effect or as leading to "Wrong." When the subject states that he cannot remember the effect, no such trend appears.

In the case of the weak choices, the persistence of choices again seems to vary with the actual experience. For these weak choices, however, due perhaps to the few choices available, only one trend is significant.

From these data it would appear that changes in behavior cannot be accounted for solely in terms of changes in cognitions. There are cases in which the cognition is constant and yet the changes in behavior vary with the changes in experience. This leads to the suggestion that there must be some medium other than, or in addition to, cognitions through which experience can bring about changes in behavior.

The foregoing considerations rule out mechanism 3 (figure) as the exclusively true mechanism. The claims of mechanisms 4, 5 and 6 as exclusive principles have already been considered too implausible to justify a test. The only choice left to us, then, is either the completely eclectic mechanism 1, or mechanism 2 with its one restriction. Both mechanisms agree (1) that experience can produce changes in cognitions without first producing changes in behavior (which everyone,

presumably, will admit), (2) that experience can produce changes in behavior without first producing changes in cognitions (which this experiment has shown) and (3) that changes in cognitions can directly produce changes in behavior. They disagree in that the most inclusive mechanism I also holds (4) that changes in behavior can bring about corresponding changes in cognitions.

The truth of this fourth contention is very difficult to establish. It is not enough to show that changes in cognitions follow, and correspond to, changes in behavior. Any changes in behavior must have been produced by some experience. And this very experience may have produced, by concomitant action, both the behavior and the corresponding cognitions.

Only by some such test can we decide whether or not behavior can directly elicit corresponding cognitions. From a priori consideration there is no reason to suppose that it should not do so. Let us suppose that a student in our experiment has, on the test day, chosen item (*b*) of a given question. He is then asked what had happened on Information Day. He may well reason thus, "I have just chosen (*b*) with some confidence (behavior), therefore I must have selected (*b*) yesterday and found out that it was right (cognition)." The phenomenon of rationalization also suggests that behavior may produce cognitions. A given piece of behavior may give rise to very elaborate (and perhaps erroneous) cognitions which correspond to the behavior and thus explain or justify it.

Summary.—A group of varying experiences were selected which happened to give rise to a single cognition. It was found that subsequent behavior showed some correspondence with the variation in the experience. Since there were no corresponding variations in cognitions, it is held that experience must be able to act on behavior in some other way in addition to its action through cognitions.

The correspondence between cognitions and behavior is, most probably, due to a variety of mechanisms, including (1) the concomitant action of experience on both behavior

and cognitions, (2) the action of cognitions on behavior and (3) the action of behavior on cognitions (as in rationalization).

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A CORRECTION TO 'THE CASE FOR THE TOLMAN-LEWIN INTERPRETATION OF LEARNING'¹

BY RALPH K. WHITE

Cornell University

In the above-mentioned article I assumed, mistakenly, that Professor Hull's system involves a merely additive theory of primary motivation. Professor Hull has kindly called my attention to the fact that he has never definitely postulated such a relationship, and that, since February, 1940, he has explicitly favored a multiplicative relationship. This was first publicly stated in a mimeographed seminar memorandum under date of February 12, 1940.² On page 4, as Postulate 10, there is given a formulation, both verbal (A) and mathematical (B), as follows:

A. Other things equal, in the functioning of a habit (\dot{H}_r) the magnitude of the excitatory potential (\dot{E}_r) evokable by a stimulus (S) is a positive multiplicative function of the effective habit strength (\dot{H}_r) and the intensity of the drive (D) active at the time.

B. $\dot{E}_r = \dot{H}_r \times f(D)$.

In 1942 a parallel statement was published, as follows:

A recent experiment by Perin³ suggests rather strongly that the relationship of habit strength (\dot{H}_r) and drive (D) to the evocation of conditioned reaction is a multiplicative one. The equation expressing this presumptive relationship is:

$$\dot{E}_r = f(D)(1 - 10^{-iR}),$$

where \dot{E}_r is the excitatory potential of s to evoke r , D is some index

¹ *Psychol. Rev.*, 1943, 50, 157-186.

² Contained in a bound volume entitled, 'Psychology Seminar Memoranda, 1939-1940,' on file in the libraries of the University of Iowa, Oberlin College, and Yale University.

³ C. T. Perin, Behavior potentiality as a joint function of the amount of training and the degree of hunger at the time of extinction. *J. exp. Psychol.*, 1942, 30, 93-113.

of physiological need or drive, such as the number of hours of food deprivation, i is an empirical constant of the order of .02, and R is the number of reinforcements.⁴

Professor Hull adds that a rather detailed statement of his theory of primary motivation is contained in his new book.⁵ "The drive stimulus (S_D)," he says, "and the habit based on it play an important role in the theory, but one which is clearly distinguishable from that of the drive (D) itself."

I hope that the operational meaning of this development in Hull's system, in relation to the experiment which I used as an illustration, is clear. As I see it, the multiplication formula implies that he would *not* necessarily predict the 'stupid' behavior of turning to the right. The disappearance of the hunger drive, as a multiplying factor, presumably reduces to zero the previously-reinforced tendency to go to the right. On the other hand, the recent development would not by itself, as far as I can see, permit a prediction of the 'intelligent' behavior of going to the left. In this respect there would still seem to be a genuine difference between Hull's most basic postulates (if not supplemented by others) and the basic postulates of Tolman and Lewin.

⁴ C. L. Hull, *Conditioning: Outline of a systematic theory of learning*. Chapter II in *The Psychology of Learning*, Forty-First Yearbook, Part II, National Society for the Study of Education. Bloomington, Ill.: Public School Pub. Co., 1942.

⁵ C. L. Hull, *Principles of behavior*. New York: D. Appleton-Century Co., 1943.

LILLIEN JANE MARTIN

1851-1943

The death of Lillian Jane Martin, emeritus professor of psychology at Stanford University on March 26, 1943, at the age of ninety-two, closed an interesting and colorful career, and a professional life which was a model of fidelity to strong interests.

When Professor Martin graduated from Vassar College in 1880, she accepted the position of science teacher in the Indianapolis High School, where her teaching fields were botany, physics and chemistry. Later she taught in the Girl's High School in San Francisco. In 1894, at the age of forty-three, she resigned her teaching position in San Francisco and left for Germany to study psychology, which had been an active interest since her early adolescence. She entered the University of Göttingen as one of the first women students in science, and was guided in her studies and research by Professor G. E. Mueller. During the four years at Göttingen she worked in general psychology and also in such diversified special fields as æsthetics, the subconscious, and the psychology of humor.

Professor Martin returned to the United States in 1898, and the following year was called to Stanford University as assistant professor of psychology. She was among the early pioneer group of women psychologists. At Stanford, in addition to her work in introductory courses in general psychology, her fields of interest were æsthetics, abnormal psychology and advanced experimental psychology. She took a personal interest in her students and did as much for their personality development as for their advancement in knowledge of theoretical principles.

Between 1899 and 1914 Professor Martin returned to Germany during alternate summers, including in her places for study and research Göttingen, Würzburg, Munich and

Bonn. She was awarded the doctor's degree by the University of Bonn in 1913. Her publications include four psychological monographs in the German language; one of them completed in collaboration with Dr. Mueller has been referred to in E. G. Boring's *History of Experimental Psychology* (pp. 366-367), as "the classical study of the psychophysics of lifted weights, that most thoroughly investigated psychophysical function."

During the years of her teaching at Stanford, Dr. Martin continued there and in Germany during the summers many of the studies originally undertaken at Göttingen. Her earlier interest in the psychology of humor was represented later in a publication in the *American Journal of Psychology* (1905, 16, 35-118) entitled 'Experimental prospecting in the field of the comic.' Her monograph 'An experimental study of Fechner's Principles of Aesthetics' appeared in the *PSYCHOLOGICAL REVIEW* in May, 1906. Her studies in the field of subconscious phenomena were exemplified by two papers, the first in the *PSYCHOLOGICAL REVIEW* (1913, 22, 251-253) entitled 'An experimental contribution to the investigation of the subconscious,' and a second in the *American Journal of Psychology* (1915, 26, 251-257), 'Ghosts and the projection of visual images.' These and other professional writings of Dr. Martin may be overshadowed for psychologists by the intriguing interest of her exceptional personal characteristics.

During the twenty-seven years after her retirement from Stanford, Dr. Martin amazed her friends not only by her energy and the breadth of her interests, but also by her capacity to blaze new trails in human welfare work through the application of psychology to the practical needs of daily life. In 1920 she established in San Francisco a mental hygiene clinic for normal children of the pre-school years. Thereafter she had a broad clinical experience in child guidance. About a decade later Dr. Martin, then almost an octogenarian, established a psychological clinic for aging men and women called the Old Age Center. From then until her death she dealt with over a thousand cases at the Center. As a phase of her kindly and sympathetic interest in elderly

persons, Dr. Martin in her late seventies ran a farm for several years and gave employment to a group of elderly men. During the past two decades, while carrying on an active clinical service for children and adults, she found time to write several books for laymen on the problems of childhood, youth and old age, and numerous magazine articles on various psychological topics.

This heavy program of professional work, however, represented only a part of the activities of this emeritus professor. Psychologists will be interested in the fact that at sixty-five she learned to typewrite and at seventy-eight to drive a car. She drove across the continent twice thereafter and made an extensive automobile trip in Mexico. At seventy-four she went around the world and at seventy-six traveled alone to Russia. At eighty-eight, Dr. Martin spent a year in travel in South America during which she made the journey up the Amazon by boat and across the Andes by plane. Her life was full and interesting to the day of her death.

Dr. Martin's courage and enthusiasm have been an inspiration to her wide circle of friends, by whom she was deeply loved and admired. Her colleagues and students in these many and diversified professional associations have found in her an interesting and stimulating companion.

NORMAN FENTON

Stanford University

AMERICAN PSYCHOLOGICAL PERIODICALS

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